Managing Acute Stress Response to Major Trauma

Patricia J. Watson, PhD, Matthew J. Friedman, MD, PhD, Josef I. Ruzek, PhD, and Fran Norris, PhD*

Address
National Center for Post-traumatic Stress Disorder, Veterans Affairs Regional Medical Center, 215 North Main Street, White River Junction, VT 05009, USA.
E-mail: patricia.j.watson@dartmouth.edu
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In this article, the authors review the current empiric literature on early interventions. Findings on the effects, course, help-seeking, and recovery from disasters are first reviewed, with recommendations given that are pertinent to intervention following mass casualties. In reviewing the most commonly used interventions, it is clear that evidence from well-controlled studies showing that early intervention can help prevent longer-term problems is limited. The authors discuss the approaches that have received the most attention or empiric support as early interventions following trauma, which include psychologic debriefing, cognitive-behavioral interventions, eye movement desensitization and processing (EMDR) and other neoteric approaches, and psychopharmacology. At this time, the most promising results for prevention of psychopathology have been achieved with brief four- or five-session cognitive-behavioral therapy. In contrast, randomized clinical trials on psychologic debriefing currently suggest that this approach is either ineffective at preventing psychopathology, or contributive to post-traumatic stress disorder symptoms. Research support is currently lacking for EMDR and pharmacotherapy as early interventions. A major challenge to the field is to integrate the practical experience and knowledge of professional responders with well-controlled, timely intervention research, and to effectively disseminate these findings to practitioners in the field.

Introduction

The management of acute stress reactions following major trauma is multifaceted, and generally aims to foster resiliency, prevent chronic emotional problems, and minimize long-term deterioration in quality of life following trauma exposure. Although it is widely believed by traumatic stress specialists that early intervention can help prevent longer-term problems, evidence addressing this belief is limited at present. The events of September 11, 2001 have given a special urgency to this area of study, and the result is that professional attention is accelerating and research is increasing. For example, a conference of experts from around the world was recently convened to seek consensus about the management of acute stress following incidents of mass violence. Conference attendees concluded that the current evidence from methodologically rigorous randomized clinical trials (RCTs) is not adequate to permit either definite endorsement or rejection of any specific approach to early psychologic intervention following mass casualties. However, recent research findings have challenged some common practices, and have suggested new directions for early intervention.

In this article, the authors will review the current empiric literature on early interventions. It must be understood at the outset that the majority of published RCTs in this field have investigated interventions provided following individual traumatic experiences (*eg*, rape, interpersonal violence, accidents) rather than following mass casualties (*eg*, major disasters, large scale terrorist attacks). Because a solid body of evidence concerning effective interventions for individual survivors and victims does not exist, strong recommendations endorsing specific preventive interventions for individuals are unwarranted at present. Moreover, there are no RCTs that specifically address early intervention with traumatized children. Before beginning a review of each intervention, however, it is necessary to consider the epidemiologic literature on psychologic consequences of large-scale traumatic events, especially with respect to adverse outcomes and vulnerable populations.

Background

Norris *et al.* [1] recently conducted a comprehensive review of the post-disaster literature on psychologic consequences of disasters. There are a few findings that are particularly pertinent to assessment and intervention of trauma survivors and victims following mass casualties. School-aged youth were the most likely to show severe impairment, and rescue and recovery workers the least likely to show severe impairment.

Symptom severity during the early phases of post-disaster recovery was a good predictor of long-term symptom severity. Delayed onset of psychologic disorders was rare. Symptoms usually peaked in the first year, and were less prevalent thereafter, leaving only a minority of communities and a minority of individuals within those communities substantially impaired. The 1-year anniversary marked a time of increased mental health service usage. Technologic disasters are generally more stressful than natural disasters, although the adverse consequences of natural disasters appear to have been much more severe in developing than in industrialized nations. Among survivors and victims of mass violence, 67% were severely impaired, compared with 39% of cohorts that experienced technologic disasters, and 34% of cohorts that experienced natural disasters.

Based on this extensive literature review, Norris *et al.* [1] noted that for disasters with a moderate level of impact, programs that reduce stress, enhance social support, and providing reassurance about future risk may be most effective at preventing or reducing adverse mental health consequences. Disasters with a high level of impact, however, generally require much more intensive and professional mental health services. The following steps are recommended for acute management after a mass trauma event: 1) accurate assessment of survivors' and victims' mental health needs, including, at minimum, assessment of post-traumatic stress disorder (PTSD), current nonspecific distress, and the risk factors associated with the event (*see* Table 1); 2) support groups and psychoeducational programs for those at low or moderate risk; 3) outreach efforts that focus on areas of the community where at-risk individuals and families are most likely to live; 4) interventions that target families and address ethnocultural diversity; and 5) support to the supporters, especially wives and mothers.

Disaster survivors and victims with ready access to social resources are least likely to require individual-focused interventions. People at greatest risk are those with limited psychologic and social resources to begin with, or those who suffer particularly dire resource losses. It should be emphasized that protection from post-traumatic distress depends greatly on the availability of naturally occurring social resources such as family, community, and social networks for both civilian and professional emergency responders. For instance, after critical incidents, 71.4% of a sample of emergency responders reported that they welcomed contact with colleagues, whereas only 9.2% welcomed contact with outside professionals [2•]. A recent prospective study of coping following mass trauma [3] recommends interventions that reinforce social networking, improved communication, appropriate expectations, realistic caution, and reduction of passive and isolative behaviors.

As evidence-based early interventions are developed, it will be important to study factors that affect use of mental health services, especially with respect to peer- and family-delivered interventions. For instance, Norris' review [1] found that people are more likely to accept help for "problems in living" than to accept help for "mental health problems." Other reports [4,5] suggest that individuals with the most severe exposure to a mass trauma often refuse to believe that they need help, and will not seek out services, despite high subjective levels of emotional distress. Their reasons for not seeking assistance include: their belief that they are "better off" than those more affected, their reluctance to acknowledge emotional distress, their conviction that expressing distress indicates weakness of some sort, and their strong preference to seek informal support from family and friends rather than from professionals.

Interventions

The first order of business in early following major trauma is attending to basic needs, such as safety, security, communication, reunification of families, attention to injuries and medical needs, return to normal routines and roles, mutual social support, and education of survivors and families about effective coping strategies. Although there is little controlled research by which to evaluate such components, they were strongly endorsed by the international panel of experts who participated in the consensus conference on early intervention, mentioned previously (for further discussion *see* [6]). Beyond this first level of response, psychologic debriefing, cognitive-behavioral interventions, eye movement desensitization and processing ([EMDR] and other neoteric approaches), and psychopharmacology are the approaches that have received the most attention and empiric support as early interventions following trauma.

Psychologic debriefing

Psychologic debriefing (PD) has been considered a key component of first-line early intervention for mass trauma over the past two decades. It generally has been offered to civilian survivors and victims, as well as rescue workers, following mass trauma, with the belief that it provides emotional relief, social support, and psychologic normalization for all individuals exposed to a significant stressor. Psychologic debriefing has been provided in both individual and group formats. It is defined here as a single-session intervention delivered in a standardized sequence that has been orchestrated to focus on disclosure of traumatic experiences, normalization of reactions to trauma, education of participants about stress reactions, enhancement of effective coping behaviors, and identification of those who may benefit from more intensive services. Although PD was originally intended for active-duty military and civilian emergency rescue personnel, it has been applied very widely in many settings. Results of RCTs conducted to-date indicate that PD delivered to individuals or couples does not prevent PTSD or other

Table 1. Adult risk factors for debilitating post-traumatic stress following a disaster [1]

Severe exposure to the disaster (especially injury, threat to life, and extreme loss)
Living in a highly disrupted or traumatized community
Female gender
Age in the middle years of 40 to 60
Little previous experience or training relevant to coping with the disaster
Ethnic minority group membership
Poverty or low socioeconomic status
The presence of children in the home
The presence of a spouse, especially if he is significantly distressed (in women only)
Psychiatric history
Secondary issues
Weak or deteriorating psychosocial resources

psychopathology [7], and may even worsen psychologic outcomes in some participants [8].

Most studies with favorable results concerning PD are difficult to interpret, because of methodologic problems or lack of statistical power. In the best controlled and most rigorous of the recent studies [9], it was found that PD did not reduce PTSD symptoms among British soldiers exposed to war trauma in Bosnia, although this intervention was associated with significant reductions in alcohol consumption. A second study designed to determine the optimal post-traumatic time interval at which to offer PD, Campfield and Hills [10], found better results for robbery victims debriefed within 10 hours of the crime than for those for whom debriefing was delayed until 48 hours post-robbery. Although this finding is interesting, it bears replication, because the primary investigator conducted every debriefing herself and acknowledged that she "may have been biased in favor of immediate debriefing." Eid *et al.* [11] evaluated the effects of a group psychologic debriefing (GPD) on acute stress reactions in military personnel and voluntary civilian firefighters following rescue work. Although lower frequencies of symptoms were found in the GPD compared with the non-debriefed group, the following variables seriously compromise the validity of the findings: very small sample size, the fact that the GPD was offered only to the military personnel (who may have very different characteristics than the firemen), and lack of random assignment.

Recent reviews of the empiric literature on PD [12•,13••] concluded that PD should not be routinely provided to individuals immediately after trauma (as is often the current practice following mass casualties), and that careful RCTs on both individual and group PD are needed. The International Society for Traumatic Stress Studies' Practice Guidelines on PD [14] state that PD cannot be recommended as an early intervention at this time. The guideline goes on to state that, if employed, PD should be conducted by experienced, well-trained practitioners, should not be mandatory, should use some clinical assessment of potential participants, and should be accompanied by clear and objective evaluation procedures.

Why might PD produce negative outcomes? Shalev [15] has hypothesized that the heightened arousal generated during a PD session may actually exacerbate the toxic potential of post-traumatic distress to produce PTSD or other adverse consequences among vulnerable individuals. Additional reasons why PD may either be ineffective or potentially toxic at different intervals, include the following: 1) survivors are often exposed to multiple and complex stressors that cannot be adequately addressed within a standard debriefing session; 2) the PD model is an inappropriate approach for acutely bereaved persons [16]; 3) participants may be further traumatized during PD by hearing the stories of others; 4) PD may stimulate ruminations which lead to depression [17]; 5) some survivors and victims may prefer an individual rather than a group format; 6) the cultural inappropriateness of such a procedure for individuals from certain ethnocultural backgrounds [18,19].

Cognitive-behavioral interventions

The most promising research concerning effective intervention following early acute traumatization has focused on cognitive-behavioral treatments (CBT) for ameliorating acute stress disorder, and for preventing the later development of PTSD. Although there has been no published research on the effectiveness of CBT following mass trauma, there are a number of studies in which CBT was administered to individuals acutely traumatized by sexual assault, motor vehicle accidents, or industrial disasters. Bryant *et al.* [20,21•] have conducted a number of methodologically sound RCTs with acutely traumatized survivors and victims who met diagnostic criteria for acute stress disorder. Results show robust clinical improvement with regard to intrusive, avoidant, as well as depressive symptoms following a five-session CBT protocol. Foa *et al.* [22] and Echebura [23] have reported similar success with a four-session CBT protocol for sexual assault survivors.

A recent study used a novel approach consisting of a two-session telephone-based CBT intervention for motor vehicle accident survivors who were called 24 and 48 hours following discharge from the emergency room [24]. A greater reduction in PTSD symptoms was noted at 3 to 4 month follow-up compared with a control intervention that consisted of supportive listening of a retelling of the accident by a counselor, who also provided information about available treatment services. Although the sample size was small, the findings from this simple, cost effective RCT on early intervention certainly merit further study.

Another interesting new CBT protocol is a writing-based CBT protocol delivered over the Internet [25]. This intervention, termed *interapy*, produced significantly lower intrusion and avoidance symptoms, general psychopathology scores, and more improvement in mood, compared

with a wait-list control; these gains from therapy were maintained or improved at the 6-week follow-up. Although this study lacked a comparison treatment group, used a small sample, and was provided to individuals with chronic PTSD, it certainly merits further investigation as a possible strategy for early intervention.

When considering CBT with survivors and victims of mass trauma, there are important caveats to keep in mind. First, CBT has yet to be tested as an intervention following a mass casualty. Secondly, Bryant and Harvey [26••] make it very clear that some elements of cognitive-behavioral interventions (*ie*, prolonged exposure) may not be appropriate for everyone. In cases where exposure may be contraindicated (*ie*, those experiencing extreme anxiety, suicide risk, marked ongoing stressors, or acute bereavement), other techniques such as anxiety management, supportive therapy, or pharmacologic intervention may be more preferable.

Eye movement desensitization and processing and other neoteric interventions

Eye movement desensitization and processing is a technique that has been strongly advocated by its adherents as an acute intervention following mass casualties. It must be stated at the outset that there are no published empiric studies with EMDR in the acute aftermath of trauma. There is, however, anecdotal literature exemplified by case examples and guidelines [27]. A recent meta-analysis of 34 studies concluded that EMDR appears to be more effective than treatment as usual or than wait-list control groups with respect to the reduction of symptoms in chronic PTSD [28]. Research also indicates that EMDR's hallmark, therapist induction of eye movements, appears to be superfluous [29]. A major question about EMDR concerns the durability of treatment effects [30]. Also, the only published study comparing EMDR with CBT indicated that the latter treatment is a more effective treatment for chronic PTSD [31].

Thought-field therapy (TFT), traumatic incident reduction (TIR), time-limited trauma therapy (T-LTT), and visual/kinesthetic dissociation (V/KD) are recent approaches that have been offered as treatments for PTSD. Each of these new methods is based on theoretic frameworks that lack empiric support, particularly in acute management of traumatic stress [32]. There is no solid evidence that any of these treatments are effective either as early interventions following a traumatic event or for treating chronic PTSD. None of these approaches can therefore be recommended at this time.

Pharmacotherapy

Although medications are routinely used to manage pain and anxiety following trauma, there are few investigations of pharmacotherapy as an early intervention. In the immediate post-traumatic period, it is difficult to distinguish acutely symptomatic individuals who will recover from those who will go on to develop clinically significant psychiatric sequelae. As a result, there is great reluctance to use any medications during the immediate aftermath of a traumatic event. However, there are both theoretic and experiential reasons [33•] to predict that judicious use of certain medications may make a significant difference in the management of acute traumatic stress reactions. Pitman *et al.* [34•] conducted an intriguing trial of the beta-adrenergic antagonist propranolol, as an early intervention to prevent PTSD. They hypothesized that propranolol, administered within 6 hours of a traumatic event, might disrupt the development of fear conditioning and consolidation of intrusive traumatic memories. Although propranolol did not protect against the development of PTSD at 3-month follow-up, it did appear to reduce physiologic reactivity among traumatized subjects who had received the medication. In a small pilot study in which low doses of the atypical antipsychotic agent, risperidone, were administered to burn victims, Stanovic *et al.* [35] reported that all subjects experienced decreased sleep disturbances, diminished nightmares or flashbacks, and decreased hyperarousal 1 to 2 days after first receiving risperidone. Although this study was a small retrospective pilot study, the results are encouraging enough to warrant a prospective study in order to understand better the potential efficacy of risperidone as an early intervention for burn patients or other acutely traumatized individuals. Finally, Robert *et al.* [36] conducted a successful RCT with the tricyclic antidepressant, imipramine, with pediatric burn patients in which significant reduction in symptoms of acute stress disorder were observed among children who received this medication.

Although benzodiazapenes are widely used for chronic anxiety syndromes, there is no evidence that they prevent the later development of PTSD or other anxiety symptoms when administered acutely (within 2 or 18 days) following a traumatic event [37].

Studies of pharmacotherapy for chronic PTSD may have relevance for considering medication as an early intervention. Pharmacotherapy for PTSD is predicated on compelling findings that a number of key psychobiologic systems are dysregulated in PTSD patients. The strongest evidence shows disruption of adrenergic and hypothalamic-pituitary-adrenocorticol mechanisms, heightened physiologic reactivity, and sleep disturbances. Post-traumatic stress disorder-related abnormalities have also been detected or inferred with regard to psychobiologic mechanisms mediated by serotonin, endogenous opioids, dopamine, thyroid hormones, corticotropin-releasing factor, and glutamatergic neurotransmitters. Finally, because PTSD is often comorbid with pharmacologically responsive disorders (*eg*, major depression, panic disorder) medication is an important treatment option to be considered [38,39].

Because of so many different psychobiologic abnormalities, almost every class of psychotropic agent has been prescribed for PTSD patients. Evidence is best for the different classes of antidepressant agents that have been tested in most of the RCTs on pharmacotherapy. The

strongest evidence supports the use of selective serotonin reuptake inhibitors (SSRIs) as first-line drugs for PTSD, especially sertraline [40,41] and paroxetine [42,43]. They not only reduce PTSD symptoms and produce global improvement, but are also effective against comorbid disorders and associated symptoms. They have relatively few side effects. These two SSRIs are the only medications thus far to have received US Food and Drug Administration approval as indicated treatments for PTSD. Furthermore, continuation studies with sertraline suggest that PTSD symptoms will continue to remit, if SSRI pharmacotherapy is extended for 6 months or more [44–46]. Older antidepressants (*eg,* tricyclic antidepressants and monamine oxidase inhibitors) have also been found to be effective treatments for PTSD. Other medications that have shown promise in less rigorous studies include the following: antiadrenergic agents, mood stabilizers and anticonvulsants, and atypical antipsychotic agents (*see* [38]).

Conclusions

There are too few well-controlled studies to support strong endorsement of any early intervention following mass casualties. At this time, however, very promising results have been achieved with brief four- or five-session CBT. On the other hand, RCTs on psychologic debriefing currently suggest that this approach is either ineffective or may exacerbate PTSD symptoms. Likewise, evidence favoring either EMDR or pharmacotherapy as an early intervention is also lacking at this time.

Controlled outcome research on acute interventions with children is a major gap in our current knowledge. Cohen *et al.* [47] noted that recent research regarding the neurobiology of PTSD emphasized the importance of early identification and treatment for children. Research investigating the effectiveness of different strategies and systems for managing acute trauma response and preventing negative consequences of exposure is developing rapidly, however, and it is to be expected that a variety of controlled outcome studies with a range of trauma populations and delivery environments will be produced in the foreseeable future.

This emerging field faces a variety of important challenges. One such challenge is to integrate the practical experience and knowledge of professional responders "in the trenches" who are called on to alleviate the acute post-traumatic distress and suffering of survivors and victims exposed to disaster, terrorism, accidental injury, violent assault, sudden unexpected death, sexual assault, childhood physical and sexual abuse, emergency services exposure, and military combat. The various service delivery settings (*eg,* rape crisis centers, field disaster sites, hospital trauma centers) have different practice traditions, available resources, and operational constraints. Related to these differences is the need to evaluate a range of early intervention practices, including, but not limited to CBT, debriefing, EMDR, or pharmacotherapy. There is also need to develop and test other approaches (*eg,* for educating trauma survivors, enhancing social support, fostering control over acute symptomatology). The field also needs to develop proactive, evidence-based strategies for developing and disseminating emerging information on promising practices to policymakers and practitioners in the field. Thus, the present challenge is two-fold—to develop and rigorously test early interventions that work; and to insure that such findings are disseminated to front-line emergency practitioners who have accepted the challenge of meeting enormous demands for psychologic support and assistance following a massive traumatic event.

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Papers of particular interest, published recently, have been highlighted as:

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