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Traumatic stress in acute leukemia

Gary Rodin^{1,2,4,5,*}, Dora Yuen^{1,2,4}, Ashley Mischitelle^{1,2,4}, Mark D Minden^{2,3,7}, Joseph Brandwein^{2,3,6}, Aaron Schimmer^{2,3,7}, Charles Marmar⁹, Lucia Gagliese^{1,4,8}, Christopher Lo^{1,4,5}, Anne Rydall^{1,2,4}, and Camilla Zimmermann^{1,2,4,6}

¹Department of Psychosocial Oncology and Palliative Care, Princess Margaret Hospital, University Health Network, Toronto, Canada

²Ontario Cancer Institute, Princess Margaret Hospital, University Health Network, Toronto, Canada

³Division of Medical Oncology and Hematology, Princess Margaret Hospital, University Health Network, Toronto, Canada

⁴Behavioural Sciences and Health Research Division, Toronto General Research Institute, University Health Network, Toronto, Canada

⁵Department of Psychiatry, University of Toronto, Toronto, Canada

⁶Department of Medicine, University of Toronto, Toronto, Canada

⁷Department of Medical Biophysics, University of Toronto, Toronto, Canada

⁸School of Kinesiology and Health Science, York University, Toronto, Canada

⁹Department of Psychiatry, New York University Langone Medical Center, New York, NY USA

Abstract

Objective—Acute leukemia is a condition with an acute onset that is associated with considerable morbidity and mortality. However, the psychological impact of this life-threatening condition and its intensive treatment has not been systematically examined. In the present study, we investigate the prevalence and correlates of post-traumatic stress symptoms in this population.

Methods—Patients with acute myeloid, lymphocytic, and promyelocytic leukemia who were newly diagnosed, recently relapsed, or treatment failures were recruited at a comprehensive cancer center in Toronto, Canada. Participants completed the Stanford Acute Stress Reaction Questionnaire, Memorial Symptom Assessment Scale, CARES Medical Interaction Subscale, and other psychosocial measures. A multivariate regression analysis was used to assess independent predictors of post-traumatic stress symptoms.

Results—Of the 205 participants, 58% were male, mean age was 50.1 ± 15.4 years, 86% were recently diagnosed, and 94% were receiving active treatment. The mean Stanford Acute Stress

*Correspondence to: Department of Psychosocial Oncology and Palliative Care, Princess Margaret Hospital, University Health Network, 610 University Ave., 16th Floor, Room-724, Toronto, Ontario, Canada M5G 2M9. gary.rodin@uhn.ca.

Conflict of interest

The authors declared no conflicts of interest.

Reaction Questionnaire score was 30.2 ± 22.5 , with 27 of 200 (14%) patients meeting criteria for acute stress disorder and 36 (18%) for subsyndromal acute stress disorder. Post-traumatic stress symptoms were associated with more physical symptoms, physical symptom distress, attachment anxiety, and perceived difficulty communicating with health-care providers, and poorer spiritual well-being (all $p < 0.05$).

Conclusions—The present study demonstrates that clinically significant symptoms of traumatic stress are common in acute leukemia and are linked to the degree of physical suffering, to satisfaction with relationships with health-care providers, and with individual psychological characteristics. Longitudinal study is needed to determine the natural history, but these findings suggest that intervention may be indicated to alleviate or prevent traumatic stress in this population.

Keywords

cancer; acute leukemia; psychosocial oncology; traumatic stress; supportive care; hematological malignancies

Introduction

Acute leukemia is a condition associated with considerable morbidity and mortality, both from the disease and from its aggressive treatment. Its clinical course is punctuated by an immediate threat to life at discrete points in the disease trajectory. However, the psychological response to this threat has not been well studied nor are the standards for psychological care in this circumstance well established.

Post-traumatic stress (PTS) symptoms represent an intense and unstable emotional state that may occur in response to the immediate experience of trauma. This state is characterized by oscillating symptoms of emotional detachment or numbing, hyperarousal, intrusive thoughts, and avoidance of reminders of the prior trauma [1,2]. More severe PTS symptoms that occur within 1 month of exposure to a traumatic event may meet DSM-IV-TR [1] diagnostic criteria for an acute stress disorder (ASD). PTS symptoms are clinically relevant because they are associated with impaired quality of life and emotional well-being and, when severe enough to meet criteria for ASD, with a ten-fold increase in the risk of completed suicide [3].

A direct relationship has been found between the severity of trauma and subsequent PTS symptoms [4]. However, factors related to the individual and the social context also predict outcome. Pre-traumatic risk factors include a past psychiatric history, lower self-esteem, less education, lower socioeconomic status, younger age, and female gender [5,6]. Post-traumatic social support and the sense of meaning and peace, captured in the construct of spiritual well-being [7], may also protect against adverse psychological effects of trauma [8].

Post-traumatic stress symptoms may be more common in cancers with an acute onset or more fluctuating course than in those that are more stable or progress more slowly. Kangas *et al.* [9] identified symptoms compatible with ASD in 28% of 82 patients hospitalized with recently diagnosed head and neck or lung cancer. In contrast, Kornblith *et al.* [10] found no

cases in 42 long-term recurrence-free survivors of ovarian cancer, and Akechi *et al.* [11] found no cases in 209 consecutive patients with terminal disease in a palliative care unit, with an average time since diagnosis of more than 2 years.

It has been shown that PTS symptoms in patients with solid tumors are directly related to the degree of physical suffering and treatment intensity [12,13] and inversely related to perceived support from family [14–16] and the adequacy of interactions with medical caregivers [17–19]. Attachment security, which reflects internalized expectations of support and the capacity to modulate emotions [20], and social support have also been shown to buffer distress in cancer patients [21]. There has been little research on PTS in patients with hematological malignancies, although high levels of intrusion and avoidance symptoms were found in a mixed sample that included participants with leukemia [22] and in 17% of long-term survivors of non-Hodgkin's lymphoma [23].

The rapid onset and fluctuating course of acute leukemia, with frequent life-threatening complications, suggest that PTS symptoms may be a common accompaniment. Patients who receive more intensive treatments may be at greater risk of PTS symptoms because such treatments are more likely to be used in those with more severe disease and previous treatment failure or relapse [24]. The intensive treatment regimens and frequent hospitalizations in patients with acute leukemia suggest that support from and communication with the medical team could play an important role in preventing and alleviating emotional distress. Early identification of PTS symptoms may allow for the implementation of specific therapeutic interventions to alleviate symptoms of ASD [25] and to prevent their persistence in high-risk populations [26]. Longer-term benefit from such interventions may result by means of facilitated navigation of traumatic life events, conferring greater resilience in the face of subsequent life challenges [27].

The aim of this study was to determine the prevalence and correlates of PTS symptoms in patients with acute leukemia. We hypothesized that symptoms of PTS in this population would be associated with a greater number of physical symptoms and more severe physical distress, higher treatment intensity, poorer communication with health-care providers, less attachment security and social support, more severe symptoms of hopelessness, and poorer self-esteem and spiritual well-being.

Materials and methods

Participants and procedures

The present study is based on the baseline assessment of 205 newly diagnosed, recently relapsed, or treatment failure patients with acute myeloid, lymphocytic, and promyelocytic leukemia (AML, ALL, and APL, respectively) participating in a longitudinal study of physical and psychological well-being. Potential participants were approached on an inpatient hematology unit or in a hematology outpatient clinic within 1 month of admission to hospital for treatment (induction, re-induction, clinical trial, or supportive care). The study took place between January 30, 2008 and May 31, 2011 at Princess Margaret Hospital (PMH), University Health Network, a comprehensive cancer center in Toronto, Canada. This

study was approved by the Research Ethics Board of the University Health Network, and all participants provided informed, written consent.

All participants were at least 18 years old, spoke and read English sufficiently to provide informed consent and complete questionnaires, and obtained a score of 20 or more on the Short Orientation–Memory–Concentration test [28], administered by research staff at the time of recruitment. Referral to the Department of Psychosocial Oncology and Palliative Care at Princess Margaret Hospital was offered to any patients who requested psychosocial assistance or reported significant emotional distress.

Measures

Participant and disease characteristics were obtained from patients and from their medical charts. These included age, gender, marital status, living arrangements, country of birth, education, employment status, average family income, past psychiatric history, disease type, disease status, duration of illness, type of treatment received, and the number of days hospitalized and on chemotherapy.

Cognitive functioning was assessed using the Short Orientation–Memory–Concentration test [28], a 6-item mental status exam validated for use in acute-care settings.

Post-traumatic stress symptoms were assessed using the 30-item Stanford Acute Stress Reaction Questionnaire (SASRQ) [29], a DSM-IV-correspondent scale that assesses symptoms of ASD, including dissociation, re-experiencing of trauma, avoidance, anxiety and hyper-arousal, and impairment in functioning. In the introductory instructions to the patient, the traumatic event referred to was the diagnosis, relapse, or refractory stage of leukemia. The SASRQ has demonstrated good test–retest reliability [29], as well as predictive, construct, discriminant, and convergent validity across diverse samples [30–32]. ASD caseness was determined on the basis of SASRQ ratings of the following DSM-IV criteria: (i) having experienced a traumatic event in the previous month; (ii) endorsement of at least three highly rated dissociative symptoms; and (iii) at least one highly rated symptom each from re-experiencing, avoidance, and hyperarousal. ASD severity was assessed by calculating the mean total SASRQ score, using an algorithm created by Koopman *et al.* [33]. Subsyndromal ASD was identified when an individual met all but one cluster of the DSM-IV criteria [9].

Physical functioning was assessed using the Karnofsky Performance Status index [34], an observer-rated measure of patient autonomy in carrying out normal activities and self-care.

Physical symptoms were assessed using a 26-item physical symptom subscale derived from the Memorial Symptom Assessment Scale [35], a well-validated multidimensional self-report scale that assesses frequency, severity, and distress associated with highly prevalent physical symptoms of cancer [35].

Treatment intensity was categorized into groups on the basis of the chemotherapy drug regimens received by the participants: (i) none (not receiving chemotherapy at the time of this assessment); (ii) low (hydroxyurea, clinical trial single agent, or low-dose cytarabine only); (iii) moderate (daunorubicin + cytarabine 3 + 7 induction [+/- tretinoin, midostaurin,

or gemtuzumab], amsacrine + cytarabine induction, ALL DFCI [36], or hyper-CVAD induction [37]); or (iv) high (NOVE-HiDAC [38] or MEC [39]).

Hopelessness was assessed using the Beck Hopelessness Scale [40], a validated 20-item self-report scale that quantifies hopelessness and negative expectancies, which has been used in terminally ill cancer populations [41,42].

Spiritual well-being was assessed using the Functional Assessment of Chronic Illness Therapy—Spiritual Well-Being Scale [7,43], a 12-item self-report measure of spiritual well-being, which includes subscales of spiritual meaning and peace, and spiritual faith.

Self-esteem was measured with the validated and widely used 10-item self-report Rosenberg Self-esteem Scale [44].

Attachment security was assessed using a modified and validated 16-item Experiences in Close Relationships Inventory [45]. This self-report inventory includes subscales of attachment avoidance (discomfort with closeness and dependence on others) and attachment anxiety (fear of rejection and abandonment).

Social support was assessed using the validated 20-item self-report Medical Outcomes Study Social Support Survey [46], which measures overall perceived support across multiple domains.

Communication with health-care providers was assessed using the validated 11-item self-report CARES Medical Interaction subscale derived from the Cancer Rehabilitation Evaluation System [47]. This subscale reflects communication about the medical condition and treatment decisions. Higher scores reflect poorer perceived communication.

Statistical analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 19.0 for Windows 2000 (IBM SPSS, Chicago, IL, USA). The relationship between PTS symptoms and all variables was evaluated using correlations and multiple regression analysis. Statistical tests were two tailed with alpha set at 0.05, and for the sequential backward elimination regressions, alpha for elimination of variables was set at 0.10.

An examination of missing data did not reveal any systematic or non-random patterns across measures. For those with missing data, scores were calculated and prorated only if 75% of items in a given measure had been answered. A series of sequential backward elimination regressions was used to build, in a stepwise manner, a final predictive multivariate model of the relationships between PTS symptoms and the following factors: (i) demographic; (ii) physical and illness related; (iii) communication; and (iv) psychosocial. Age and gender were retained as covariates in the final model and entered in the first step.

Results

Patient characteristics

Of the 456 patients approached, 288 (63%) consented to participate. Of the 168 (36%) who refused, 66 (39%) were not interested, 56 (33%) felt too unwell, and 23 (14%) cited the time required. Of those who consented, 205 (71%) completed baseline questionnaires and were included in the present analyses (Figure 1).

Of the 205 participants, 187 (91%) were inpatients at the time of assessment. Patients who refused to participate ($n = 168$) or did not complete the measures ($n = 83$) did not differ from the 205 who completed the measures, in terms of leukemia type, age, or gender (the only data available for comparison because of strict Research Ethics Board guidelines at our institution regarding privacy and confidentiality of patient information). Participant and disease characteristics and mean scale scores and ranges are presented in Table 1.

Physical functioning, pain, symptomatic distress, and treatment intensity

Of the total sample, 159 (78%) scored ≥ 70 on the Karnofsky Performance Status index (ranging from no complaints/evidence of disease to able to care for self but unable to carry on normal/active work) at baseline. Overall, the five most commonly reported physical symptoms on the Memorial Symptom Assessment Scale were: lack of energy (78%), feeling drowsy (59%), difficulty sleeping (57%), dry mouth (53%), and weight loss (53%); pain was reported by 48% of the sample. One hundred seventy-four patients (85%) reported ≥ 5 concurrent physical symptoms, with 98 (48%) of these reporting ≥ 10 concurrent symptoms. The majority of participants (89%) were receiving chemotherapy treatment of moderate–high intensity.

Psychosocial distress and functioning, and communication

Ten percent (19/197) of participants reported moderate to severe hopelessness, on the basis of a cutoff score of ≥ 8 on the Beck Hopelessness Scale [40]. Social support was relatively high across all domains of the Medical Outcomes Study Social Support Survey, with 65% (130/199) of participants reporting that overall support was available to them ‘most’ to ‘all of the time’. The majority of participants also reported high levels of self-esteem, with 90% (181/201) endorsing positive self-esteem responses according to standard scoring criteria [44].

On the basis of the CARES, 94% (188/200) of participants reported few or no problems related to information-seeking, communicating, and active participation in their own medical care. Of the 12 participants who scored >1 (experiencing a fair amount to very much communication difficulty), 3 (25%) met criteria for ASD and 5 (42%) for subsyndromal ASD. Results also showed that these participants were younger and had higher hopelessness and PTS symptoms, lower self-esteem, and less perceived social support compared with those who had little or no communication difficulty (Table 2).

Post-traumatic stress symptoms

Of the 200 participants who completed the SASRQ, 27 (14%) met diagnostic criteria for ASD and 36 (18%) for subsyndromal ASD. Of those with subsyndromal ASD, 15 (42%) did not meet the criteria for dissociation, 11 (31%) did not meet the criteria for re-experiencing, 8 (22%) did not meet the criteria for avoidance, and 2 (6%) did not meet the criteria for anxiety. Those who met the ASD criteria tended to have higher hopelessness and a past psychiatric history compared with the rest of the sample. ASD caseness was also associated with greater physical symptom distress, poorer communication with health-care providers, less perceived social support, lower self-esteem and spiritual well-being, and higher attachment anxiety (Table 3).

Fifty-four of the 200 participants (27%) scored ≥ 40 on the SASRQ, a score that has been found to have optimal sensitivity and specificity in predicting subsequent PTS disorder [48]. Correlations of PTS symptoms, measured by the SASRQ, with other study variables are shown in Table 1.

Multivariate analyses

Multivariate regression results are reported in Table 4: 40.2% of the variance (adjusted R^2) in predicting PTS symptoms (SASRQ total score) was accounted for by more physical symptoms and physical symptom distress, poorer communication with health-care providers, higher levels of attachment anxiety, and lower spiritual well-being. Poorer communication with health-care providers and higher attachment anxiety had the greatest relative influence on PTS symptoms.

Discussion

In this first systematic study of PTS symptoms in patients with acute leukemia, 14% met DSM-IV criteria for ASD and an additional 18% met the criteria for subsyndromal ASD. This prevalence is much higher than that reported in more chronic forms of cancer but similar to that in patients with recently diagnosed cancers [10,11]. Factors associated with PTS symptoms in the present study were the number of physical symptoms and distress about these symptoms, greater attachment anxiety, poorer communication with health-care providers, and lower spiritual well-being. Treatment intensity was not found to be associated with PTS symptoms.

The finding that poorer communication with health-care providers was significantly associated with PTS symptoms is compatible with other research showing that supportive communication with health-care providers is associated with less distress in patients with cancer [49]. Communication may be particularly important in acute leukemia because the illness and treatment intensity and prolonged hospitalizations necessitate close working relationships between patients and their health-care providers. We also found a relationship between PTS symptoms and attachment anxiety, which was an even stronger predictor of distress than the current perceived social support.

The participants in this study were all being treated for the new onset, relapse, or treatment failure of acute leukemia. However, only 10% of the sample scored above the cutoff on the

Beck Hopelessness Scale, less than half the proportion found in patients with metastatic solid tumor cancers [50]. This relatively low level of hopelessness may be because almost 94% were undergoing induction or re-induction treatment with curative intent and because of their high overall satisfaction with communication with their medical caregivers. Further, the relatively low frequency of past psychiatric history (8%), much less than in the general population [51], and the relatively high self-esteem and perceived social support suggest a high degree of resilience in this sample. Rates of PTS symptoms could be even higher in more vulnerable populations facing leukemia.

Specific interventions may be of value to better support these patients through the life-threatening ordeal of acute leukemia and its intensive treatment. However, in the present study, only 10% (20/205) of the total sample and 26% (7/27) of those with ASD had been referred for specialized psychosocial care provided by a psychiatrist or psychologist by the time of this assessment, despite the ready availability of these services at our center. The extent to which specific or routine specialized psychological support may reduce PTS symptoms and other manifestations of distress requires further study. However, early intervention has the potential to diminish the long-term emotional sequelae that have been observed in cancer survivors [52].

There are strengths and limitations to the present study. It was conducted at a regional treatment center for acute leukemia, the participation rate was reasonably high for a study of this kind, and no differences in leukemia type, age, or gender were detected between study participants and those who refused participation. However, it is possible that participants differed in undetected ways from those who declined or were unable to participate. Other limitations include: that communication with medical caregiver scores in the sample were positively skewed, that findings were based on self-report measures by relatively well-educated participants, and that patients who could not read and speak English were excluded. Further, because the data are cross-sectional, longitudinal research is needed to distinguish correlative from predictive relationships.

This study demonstrates that PTS symptoms are relatively common in acute leukemia, with approximately one-third of this sample reporting clinically significant symptoms of traumatic stress. The association of these symptoms with physical suffering and with relational and individual psychological factors suggests that an integrated approach to psychosocial intervention and palliative care may be of value. Unlike trauma in other contexts, the medical settings in which these patients are treated provide unique opportunities for medical caregivers or specialized mental health practitioners to prevent and alleviate emotional and physical distress.

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Figure 1.

Flow diagram of participant recruitment. ^aMost participants were consented within 1 month following their initial diagnosis (new/relapse/treatment failure), but some patients because of unforeseen circumstances were approached between 2 and 4 months ($n = 7$)

Table 1

Patient and disease characteristics and physical and psychosocial distress and functioning

Variable	No. of patients, <i>n</i> (%)	Mean	SD	Range	Correlations with PTS symptoms <i>r</i>
<i>Demographic variables^a</i>					
Age (years)	<i>n</i> = 205	50.1	15.4	18.3–81.1	–0.11
Gender					0.16*
Male	119/205 (58.0%)				
Female	86/205 (42.0%)				
Married/common law	146/203 (71.2%)				–0.05
Living alone	26/205 (12.7%)				–0.06
Canadian born	121/205 (59.0%)				–0.01
Ethnicity (White)	136/205 (66.3%)				–0.14
College/university education	148/204 (72.5%)				0.02
Employment status					0.17*
Employed	108/204 (52.7%)				
Student/retired	67/204 (32.8%)				
Unemployed/on disability	29/204 (14.2%)				
Mean family income					–0.12
\$29,999	22/205 (10.7%)				
\$30,000–59,999	55/205 (26.8%)				
\$60,000	86/205 (42.0%)				
Not answered	42/205 (20.5%)				
Past psychiatric history	17/205 (8.3%)				0.21**
<i>Physical and illness-related variables^b</i>					
Disease type					0.08
AML	139/205 (67.8%)				
ALL	47/205 (22.9%)				
APL	19/205 (9.3%)				
Mean illness duration (months)	<i>n</i> = 205	1.0	0.6	0.1–4.4	0.07
Disease status					–0.08
New onset	176/205 (85.9%)				

Variable	No. of patients, <i>f</i> / <i>n</i> (%)	Mean	SD	Range	Correlations with PTS symptoms <i>r</i>
Relapse/treatment failure	29/205 (14.1%)				
Treatment type					-0.11
Active: induction/re-induction (with curative intent)	193/205 (94.1%)				
Clinical trial/supportive care (no curative intent)	12/205 (5.9%)				
No. of days hospitalized	<i>n</i> = 198	21.2	14.6	0-88	0.13
No. of days on chemotherapy	<i>n</i> = 204	19.6	16.0	0-89	0.09
Treatment intensity (chemotherapy dose/intensity)					0.10
None or low	23/205 (11.2%)				
Moderate or high	182/205 (88.8%)				
Physical functioning (KPS)	<i>n</i> = 205	71.3	11.1	40-100	-0.22**
No. of physical symptoms (MSAS)	<i>n</i> = 205	11.2	5.1	0-27	0.34**
Physical symptom severity (MSAS)	<i>n</i> = 203	2.0	0.5	1-3	0.28**
Physical symptom distress (MSAS)	<i>n</i> = 198	1.5	0.8	0-4	0.41**
<i>Communication variable</i>					
Communication with health-care providers (CARES)	<i>n</i> = 200	0.3	0.5	0-3	0.34**
<i>Psychosocial variables</i>					
Social Support (MOS-SSS)	<i>n</i> = 199	83.1	18.0	5-100	-0.21**
Self-esteem (RSES)	<i>n</i> = 201	35.4	4.8	17-40	-0.35**
Hopelessness (BHS)	<i>n</i> = 197	2.9	3.2	0-17	0.35**
Attachment anxiety (ECR-MI6)	<i>n</i> = 188	2.2	1.2	1-6	0.48**
Attachment avoidance (ECR-MI6)	<i>n</i> = 196	2.6	1.2	1-7	0.13
Spiritual well-being (FACIT-Sp)	<i>n</i> = 201	36.8	7.8	5-48	-0.37**
Spiritual meaning and peace (FACIT-Sp)	<i>n</i> = 200	25.9	4.9	4-32	-0.46**
Spiritual faith (FACIT-Sp)	<i>n</i> = 201	10.7	4.7	0-16	-0.16*
Post-traumatic stress symptoms (SASRQ)	<i>n</i> = 200	30.2	22.5	0-96	

f/*n*, frequency/sample size; AML, acute myeloid leukemia; ALL, acute lymphocytic leukemia; APL, acute promyelocytic leukemia; KPS, Karnofsky Performance Status; MSAS, Memorial Symptom Assessment Scale; BHS, Beck Hopelessness Scale; RSES, Rosenberg Self-esteem Scale; ECR-MI6, Modified 16-item Experiences in Close Relationships Inventory; FACIT-Sp, Functional Assessment of Chronic Illness Therapy—Spiritual Well-Being Scale; MOS-SSS, Medical Outcomes Study Social Support Survey; SASRQ, Stanford Acute Stress Reaction Questionnaire.

Demographic variables: age, gender (female versus male), marital status (married/common law versus other), living situation (alone versus with others), country of birth (Canadian born versus not), self-report ethnicity (White versus not), education (college/university versus not), employment status (unemployed/on disability versus other), mean family income (\$60,000 or greater versus not), past psychiatric history (yes versus no).

Physical and illness-related variables: disease type (AML versus other); disease status (new onset versus relapse/treatment failure); duration of illness in months (date of diagnosis to questionnaire completion date); type of treatment (clinical trial/supportive care versus active treatment); number of days hospitalized and on chemotherapy (until questionnaire completion date); treatment intensity (moderate or high versus none or low).

* Correlation is significant at the $p < 0.05$ level (2-tailed).

** Correlation is significant at the $p < 0.01$ level (2-tailed).

Table 2
Comparisons of participants in relation to communication difficulty with health-care providers

Variables	Scored >1 on CARES ^a (n = 12)			Scored 1 on CARES ^b (n = 188)		
	Mean	SD		Mean	SD	t
Age (years)	39.2	14.1		50.6	15.2	2.5
Duration of illness (months)	0.9	0.4		1.0	0.6	0.7
KPS rating	70.8	10.8		71.3	11.3	0.1
No. of physical symptoms	9.3	2.5		9.2	4.2	-0.06
Physical symptom distress	1.8	0.8		1.4	0.8	-1.4
Physical symptom severity	2.1	0.4		2.0	0.5	-0.5
Hopelessness	4.8	3.7		2.7	3.1	-2.1
Self-esteem	31.7	6.2		35.6	4.6	2.8
Social support	70.5	23.1		83.8	17.4	2.5
Attachment avoidance	3.1	1.6		2.5	1.1	-1.6
Attachment anxiety	2.9	1.3		2.2	1.2	-1.8
Spiritual well-being	32.2	10.6		37.1	7.5	1.6
Post-traumatic stress symptoms	51.2	18.8		29.2	22.1	-3.4

KPS, Karnofsky Performance Status.

^aCARES > 1: A score of greater than 1 refers to a fair amount to very much communication difficulty.

^bCARES 1: A score of 1 or less refers to no or little communication difficulty.

* *p*-value: Significance at the *p* < 0.05 level (2-tailed).

Table 3

Comparisons of participants in relation to acute stress disorder (ASD) caseness^a

Variables	Met ASD criteria (<i>n</i> = 27)			Did not meet ASD criteria (<i>n</i> = 173)		
	<i>f</i> / <i>n</i>	%		<i>f</i> / <i>n</i>	%	
Female gender	14/27	51.9		69/173	40.0	χ^2 1.4 1 0.30
Married/common law	18/27	66.7		125/173	72.3	0.4 1 0.65
Living alone	4/27	14.8		21/173	12.1	0.1 1 0.75
Treatment intensity (none-low)	1/27	3.7		21/173	12.1	1.7 1 0.32
Treatment type (clinical trial/supportive care)	0/27	0.0		12/173	6.9	2.0 1 0.38
Newly diagnosed	23/27	85.1		148/173	85.5	0.002 1 1.00
Hopelessness, scored 8 on BHS	8/26	30.8		11/169	6.5	15.1 1 <0.001*
Past psychiatric history	6/27	22.2		11/173	6.4	7.6 1 0.02*
Age (years)	Mean 47.6	SD 14.7		Mean 50.5	SD 15.4	<i>t</i> 0.9 198 0.36
Duration of illness (months)	1.1	0.5		1.0	0.6	-1.3 198 0.20
KPS rating	68.2	9.2		71.9	11.5	1.6 198 0.11
No. of physical symptoms	10.5	3.6		9.0	4.2	-1.7 198 0.09
Physical symptom distress	1.9	0.6		1.4	0.8	-3.1 190 0.002*
Physical symptom severity	2.1	0.4		2.0	0.5	-1.9 195 0.06
Poor communication with health-care providers	0.6	0.8		0.2	0.4	-2.2 27.7 0.04*
Self-esteem	32.0	5.9		35.9	4.4	3.3 30.7 0.003*
Social support	73.6	24.2		84.5	16.4	2.2 29.9 0.03*
Attachment avoidance	2.8	1.1		2.6	1.2	-0.8 192 0.44
Attachment anxiety	3.3	1.3		2.1	1.1	-5.2 184 <0.0001*
Spiritual well-being	32.5	7.5		37.5	7.7	3.1 196 0.002*

f/*n*, frequency/sample size; BHS, Beck Hopelessness Scale; KPS, Karnofsky Performance Status.^a ASD caseness was determined on the basis of SASRQ ratings of the following DSM-IV criteria: (i) having experienced a traumatic event in the previous month; (ii) endorsement of at least three highly rated dissociative symptoms; and (iii) endorsement of at least one highly rated symptom each from re-experiencing, avoidance, and hyperarousal.* *p*-value: Significance at the *p* < 0.05 level (2-tailed).

Table 4

Sequential regression predicting post-traumatic stress (PTS) symptoms^{a,b}

	Unstandardized coefficient	SE	Standardized coefficient	F	p-value
Physical and illness-related variables ^c					
Physical symptom distress	5.769	1.868	0.204	9.540	0.002
No. of physical symptoms	0.997	0.363	0.179	7.551	0.007
Communication variable ^d					
Communication with health-care providers	11.650	3.023	0.233	14.851	<0.0001
Psychosocial and psychological variables ^e					
Attachment anxiety	5.260	1.212	0.279	18.831	<0.0001
Spiritual well-being	-0.522	0.176	-0.184	8.814	0.003
R ² (adjusted) = 0.402					

^aDependent variable: SASRQ prorated total score; 175 participants provided sufficient data for all measures and were included in the regression analysis.

^bAge and gender were non-significant but were retained in the final model as covariates entered in the first step.

^cPhysical and illness-related variables: disease type (AML '1' versus other '0'); disease status (new onset '1' versus relapse/treatment failure '0'); duration of illness in months (date of diagnosis to questionnaire completion date); type of treatment (active treatment '1' versus clinical trial/supportive care '0'); number of days hospitalized (until questionnaire completion date); treatment intensity (moderate or high '1' versus none or low '0'); physical functioning (KPS); total number of physical symptoms, physical symptom severity and physical symptom distress (MSAS).

^dCommunication variable: communication with health-care providers (CARES).

^ePsychosocial variables: overall social support (Medical Outcomes Study Social Support Survey); spiritual well-being (Functional Assessment of Chronic Illness Therapy—Spiritual Well-Being Scale total score); self-esteem (Rosenberg Self-esteem Scale); hopelessness (Beck Hopelessness Scale); attachment anxiety and attachment avoidance (Modified 16-Item Experiences in Close Relationships Inventory).