Dissociative symptoms in alcohol-dependent patients: associations with childhood trauma and substance abuse characteristics

Ingo Schäfer\textsuperscript{a,b,*}, Ulrich Reininghaus\textsuperscript{a}, Willie Langeland\textsuperscript{c}, Anne Voss\textsuperscript{a}, Nina Zieger\textsuperscript{a}, Christian Haasen\textsuperscript{a,b}, Anne Karow\textsuperscript{a,b}

\textsuperscript{a}Department of Psychiatry and Psychotherapy, University Medical Center Hamburg-Eppendorf, 20246 Hamburg, Germany
\textsuperscript{b}Center for Interdisciplinary Addiction Research, University of Hamburg, 20246 Hamburg, Germany
\textsuperscript{c}Amsterdam Institute for Addiction Research, University of Amsterdam and Department of Psychiatry, Vrije University, 1105 BC Amsterdam, The Netherlands

Abstract

Objective: Inconsistent findings have been reported concerning the level of dissociative symptoms and their relationship with childhood trauma in alcohol-dependent patients. The present study aimed to further examine the level of dissociation and the trauma-dissociation relationship in a sample of alcohol-dependent patients, taking potential mediating factors into account.

Method: A sample of 100 consecutively admitted inpatients with alcohol dependence according to the \textit{Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition} were administered the Dissociative Experiences Scale, the Childhood Trauma Questionnaire, the International Diagnostic Checklist for posttraumatic stress disorder, the European Addiction Severity Index, and an additional questionnaire assessing the age at onset of different symptoms of alcohol dependence.

Results: Substantial rates of childhood trauma were found. However, the mean Dissociative Experiences Scale score was low (9.0). Dissociative symptoms were significantly related to childhood emotional abuse; however, other forms of childhood trauma and posttraumatic stress disorder status were not. Younger age at onset of alcohol dependence was related to both childhood trauma and a higher level of dissociative symptoms. In a hierarchical linear regression model, emotional abuse was found to contribute to dissociation independent of potential chronic residual effects resulting from early onset of alcohol abuse as well as its chronicity or severity.

Conclusion: The findings support the idea that (clinically significant) dissociation is relatively uncommon in alcohol-dependent patients. Yet, when it occurs, dissociation is associated with childhood emotional abuse independent of chronic alcohol abuse. In addition, patients with an earlier onset of alcohol dependence could be more similar to patients with other substance-related disorders with regard to levels of dissociation.

© 2007 Elsevier Inc. All rights reserved.

1. Introduction

In recent years, the role of dissociation in psychiatric patients has received considerable attention. High rates of current dissociative disorders according to the \textit{Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)}\textsuperscript{[1]} have consistently been reported for patients in different clinical settings\textsuperscript{[2-4]}; and dissociative symptoms have been found to be a potential mediator of the course and outcome of psychiatric disorders\textsuperscript{[5-7]}. Yet, evidence on dissociative experiences in patients with substance use disorders remains contradictory. For instance, Ross et al\textsuperscript{[8]} examined 100 patients with different substance-related disorders using the Dissociative Disorders Schedule (DDIS,\textsuperscript{[9]}). In this sample, a rate of dissociative disorders according to the \textit{Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition} as high as 39\% was found. In another sample of 100 patients with substance use disorders, Dunn et al\textsuperscript{[10]} reported a much lower rate of dissociative disorders (15\%). Interestingly, a significantly lower rate of dissociative disorders as measured by the DDIS was found in the 66 patients with alcohol dependence (8\%) compared with patients with drug or polysubstance dependence (34\%). This is in accordance with a study by Karadag et al\textsuperscript{[11]} in 215 patients with drug or alcohol dependence.
These authors administered the DDID as well as the Structured Clinical Interview for DSM-IV dissociative disorders [12] to a subsample of their patients (n = 112) and found in 17% a current dissociative disorder. However, although 73% of the 37 patients with drug dependence received this diagnosis, this was the case for only 27% of the alcohol-dependent patients. In studies using the Dissociative Experience Scale (DES, [13]), similar differences were found. Lower levels of dissociative symptoms were repeatedly reported for alcohol-dependent patients (eg, [14-16]) compared with patients with drug dependence or mixed samples (eg, [10,17,18]). However, the findings in alcohol-dependent patients remain contradictory. For instance, Langeland et al [16], in a study among 155 alcohol-dependent patients, reported a low DES mean score (11.2) and also a low level of pathologic dissociation as indicated by the taxon score of the DES [19]. By contrast, Wenzel et al [20] found a DES mean score of 26.2 in male alcohol-dependent patients. On the basis of findings on lifetime years of substance use as a significant predictor of dissociation, these authors also suggested that dissociation may be a chronic residual effect of long-term substance abuse. However, there is no information regarding the confounding effect of current posttraumatic stress disorder (PTSD) status because this variable is often not taken into account in the analyses of the relationship between dissociation and alcohol dependence.

Childhood trauma has been put forward as one of the main predictors of dissociation in community as well as clinical samples [21,22]. Although many studies focused mainly on childhood physical and sexual abuse, the role of other forms of childhood trauma, especially emotional abuse and neglect, has been highlighted in the last years (eg, [23,24]). Substantial rates of childhood trauma have been consistently reported for alcohol- or drug-dependent patients. For instance, Langeland et al [16] found that 23.9% of alcoholic patients had experienced childhood physical abuse and 14.2% had experienced childhood sexual abuse. In a study by Karadag et al [11], 65.2% of inpatients with alcohol or drug dependency reported at least 1 type of childhood trauma. Despite these high rates of childhood trauma in patients with substance use disorders, several authors reported an absence of the relationship between childhood trauma and dissociation [8,16,25]. In this context, the hypothesis of “chemical dissociation” [26,27] instead of psychologic dissociation as a reaction to traumatic experiences in patients with substance use disorders has been proposed. The concept of chemical dissociation assumes that traumatized individuals with limited capacities to psychologically dissociate may attempt to produce dissociativelike effects by using psychoactive substances [16]. Other studies suggest that childhood trauma is related to psychologic dissociation also in patients with substance use disorders [28,10]. A potential explanation for these contradictory findings could be that most studies examining the childhood trauma-dissociation relationship did not control for the type of substance use disorder. As mentioned above, the level of dissociative experiences seems to vary between patients with different types of substance abuse; and differences between the groups concerning the childhood trauma-dissociation link cannot be excluded. Furthermore, several of the studies reporting no association between childhood trauma and dissociative symptoms focused only on childhood sexual and physical abuse and did not consider the influence of emotional abuse and neglect. Clearly, emotional maltreatment is a relatively neglected entity in psychiatric research and merits more attention.

On the basis of these findings, we aimed to replicate the low levels of dissociative symptoms reported for alcohol-dependent patients when using the DES, to assess a broad spectrum of childhood traumatic experiences in this population, and to examine whether different types of childhood trauma would be associated with dissociation in a group comprising only patients with a diagnosis of alcohol dependence. We further sought to examine potential effects of PTSD status on the level of dissociation and of alcohol abuse characteristics (age at onset, severity, and years of lifetime abuse) on the childhood trauma–dissociation relationship.

2. Method

2.1. Participants

The participants were consecutively admitted to a specialized detoxification unit of the University Medical Center Hamburg-Eppendorf (Hamburg, Germany) between July 2004 and May 2005. Inclusion criteria were a DSM-IV diagnosis of alcohol dependence, age between 18 and 65 years, and sufficient German language abilities. Exclusion criteria were the presence of another substance use disorder, psychotic syndromes, or severe cognitive impairments. All patients had continuously used alcohol before admission and had to have completed detoxification before they were interviewed (interviews held at least 10 days after admission). All participants gave written consent after being informed on the purpose and procedures of the study.

2.2. Instruments

The International Diagnostic Checklists for DSM-IV (IDCL, [29,30]) were used to diagnose PTSD and confirm the diagnosis of alcohol dependence. The IDCL assess all DSM-IV criteria of the respective disorders on the basis of a clinical interview including focused diagnostic questions of the clinician and all other available information. All interviews were conducted by trained raters. The interrater reliability as well as the test-retest reliability of this instrument were shown to be good to excellent [29,30].

Dissociative symptoms were assessed with the DES [13]. This reliable and internally consistent self-report questionnaire is the most widely used instrument for dissociative symptoms in clinical samples. It contains items referring to amnesia, depersonalization, derealization, absorption, and identity alteration and comprises 3 subscales (absorption,
dissociation assumes a typological model of dissociation [31]. In the introduction of the 
questionnaire, participants are instructed to report only experiences of when they were not under the influence of alcohol or drugs. In addition, the interviewers asked the participants to pay special attention to this point when the instrument was administered. The 8-item DES-taxon score (DES-T), a subscale from the DES comprising the items 3, 5, 7, 8, 12, 13, 22, and 27, was computed as a measure of “pathologic dissociation” [32]. The construct of pathologic dissociation assumes a typological model of dissociation instead of the idea that a “dissociative continuum” exists. In this continuum (dimensional) model, dissociation is anchored at one pole by the “normal dissociations of common life, such as highway hypnosis and daydreaming” [32], and at the other pole by pathologic dissociative states, such as depersonalization and dissociative amnesia. In contrast to this, the typological model distinguishes between pathologic and nonpathologic dissociative states and predicts that most individuals in nonclinical samples have little or no probability of experiencing pathologic dissociative symptoms [19]. In the current sample, the DES total score showed high internal consistency (Cronbach α = .92). Good internal consistency was also found for DES subscales and the DES-T (amnesia: Cronbach α = .82, absorption: Cronbach α = .83, depersonalization: Cronbach α = .70, DES-T: Cronbach α = .67).

The type and severity of childhood trauma was assessed using the Childhood Trauma Questionnaire (CTQ, [33]). This 28-item self-report questionnaire assesses not only physical and sexual abuse but also emotional neglect, emotional abuse, and physical neglect. The 5 types of childhood trauma are continuously measured, with scores of each subscale ranging from 5 to 25. Items are rated on a 5-point scale (1 = never true, 5 = very often true). Strong psychometric properties have been demonstrated for the CTQ in clinical as well as community samples [34].

Data on the severity and chronicity of alcohol dependence problems and suicide attempts were obtained using the German version of the European Addiction Severity Index (EuropASI, [35]). The EuropASI has been developed on the basis of the fifth version of the American Addiction Severity Index [36]. Adaptations of the American Addiction Severity Index were kept to a minimum. A limited number of new items not existing in the American original were introduced, especially in the medical section (hepatitis infection, HIV status), the employment section (debts), and the psychiatric section (numbers of suicide attempts) [37]. As in the original version, ratings of severity of alcohol dependence problems are made on a 10-point scale ranging from 0 (no treatment required) to 9 (treatment required because of life-threatening situation). Chronicity of alcohol use was estimated from the participants’ reports of years of lifetime alcohol use, which is defined as use of at least 3 times per week or binge use of at least 2 consecutive days per week in the EuropASI. In addition to the EuropASI, a specific questionnaire was used to assess the age at onset of each of the DSM-IV criteria for alcohol dependence [38].

2.3. Data analysis

Data on childhood trauma and age at onset of alcohol abuse problems were analyzed using Spearman correlation coefficient (2-tailed probabilities). Univariate linear regression analyses were conducted to identify variables significantly associated with DES and DES-T mean scores. Nonnormal distributions of DES and DES-T mean scores were corrected using square-root transformation.

The regression equations for DES and DES-T mean scores as primary outcomes and CTQ total or subscale scores as main explanatory variables were first adjusted by variables relating to age at onset of alcohol use and dependence, respectively, using hierarchical regression analysis, starting with the variable associated strongest with DES and DES-T mean scores. Age and severity of alcohol dependence were then added as the most important a priori confounders. In the next step, sociodemographic and clinical variables were added one by one to the regression equation, again starting with the variable associated strongest with level of dissociation. For all multivariate analyses, multicolinearity among explanatory variables was assessed by examining their tolerances and variance inflation factors. All data were analyzed using SPSS 12.0 for Windows (SPSS Inc, Chicago, Ill).

3. Results

During the period of data collection, 143 consecutively admitted patients fulfilled the inclusion criteria. Of these, 18 (13%) could not be included because they left the ward too soon after the minimum length of stay defined in the study protocol; and 25 (18%) chose not to participate after the aims of the study had been explained. The final sample size of 100 patients represented 70% of all eligible patients. No significant differences between the drop-out group and the included group were revealed in age at admission ($F_{1,140} = 0.812, P > .05$) or male-female ratio ($\chi^2_{1} = 0.15, P > .05$). The drop-out group did not differ from the included group with respect to the age at which the patients started to use alcohol excessively ($U = 1862, P > .05$), the number of years of excessive alcohol use ($U = 1472.5, P > .05$), and the total number of alcohol-related admissions ($U = 1895, P > .05$).

Table 1

Level of dissociation as measured by the DES

<table>
<thead>
<tr>
<th>DES</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscale absorption</td>
<td>13.1</td>
<td>10.9</td>
</tr>
<tr>
<td>Subscale depersonalization</td>
<td>4.5</td>
<td>6.8</td>
</tr>
<tr>
<td>Subscale amnesia</td>
<td>5.2</td>
<td>7.0</td>
</tr>
<tr>
<td>Total score</td>
<td>9.0</td>
<td>8.0</td>
</tr>
<tr>
<td>DES-T score</td>
<td>4.1</td>
<td>5.8</td>
</tr>
</tbody>
</table>

...
Table 2
Childhood trauma questionnaire subscales and cut scores (N = 100)

<table>
<thead>
<tr>
<th>CTQ score</th>
<th>CTQ cut scores*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>7.5 4.4 80 2</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>6.6 4.2 82 3</td>
</tr>
<tr>
<td>Physical neglect</td>
<td>7.9 3.7 75 0</td>
</tr>
<tr>
<td>Emotional neglect</td>
<td>12.2 5.2 66 2</td>
</tr>
<tr>
<td>Emotional abuse</td>
<td>9.7 5.2 73 2</td>
</tr>
<tr>
<td>Total score</td>
<td>42.8 17.6</td>
</tr>
</tbody>
</table>

* According to the authors of the CTQ [33].

The mean age of the final sample was 43.8 years (SD = 9.6; range, 21-63), 32% of participants were female, 38% of participants were married or cohabiting with a partner, and 43% were employed.

3.1. Prevalence of dissociative symptoms, traumatic experiences, and PTSD

Levels of dissociation as measured by the DES are displayed in Table 1. There was only a low proportion (3%) of participants with DES scores of 30 or higher, a cutoff point recommended for the identification of dissociative disorders [39,11]. Also, the level of pathologic dissociation as measured by the DES-T was low (Table 1).

In the CTQ, substantial rates of childhood abuse were reported (Table 2). The scores for emotional trauma during childhood were even higher than those for sexual and physical abuse, with 25% of the sample reporting at least "moderate to severe" emotional abuse and 32% reporting at least "moderate to severe" emotional neglect, according to the cut scores of the CTQ proposed by the authors [33]. In the diagnostic interview, 65% of the participants reported at least 1 traumatic event fulfilling criterion A of the DSM-IV criteria of PTSD [1]; and there was a substantial rate of patients with a current comorbid diagnosis of PTSD (15%). In most patients (n = 12), the disorder was related to traumatic experiences in childhood, mainly childhood sexual and physical abuse. Another 3 patients had PTSD after physical violence in adulthood and witnessing the violent death of a beloved person.

3.2. Childhood trauma and symptoms of alcohol dependence

Findings indicate that participants who had experienced childhood trauma were younger at age of onset of alcohol use. A significant negative relationship was observed between CTQ total score and age at first contact with alcohol ($\rho = -0.21, P = .038$) as well as age at first intoxication ($\rho = -0.26, P = .014$). The physical abuse subscale of the CTQ was most consistently associated with age of onset of alcohol use (first intoxication: $\rho = -0.23, P = .028$; regular use: $\rho = -0.21, P = .042$; tolerance: $\rho = -0.22, P = .037$; loss of control: $\rho = -0.26, P = .013$; withdrawal symptoms: $\rho = -0.24, P = .032$), indicating that participants with higher physical abuse scores were younger when they started to use alcohol and experienced substance abuse problems for the first time. Furthermore, there was a significant negative relationship between CTQ emotional abuse and age at onset of an increased level of tolerance ($\rho = -0.23, P = .034$) and loss of control over use of alcohol ($\rho = -0.24, P = .023$). There was no significant relationship between CTQ ratings and both EuropASI chronicity and severity of alcohol abuse.

3.3. Dissociative symptoms, childhood trauma, symptoms of alcohol dependence, and PTSD

Table 3 summarizes the findings on DES and DES-T mean scores significantly associated with childhood trauma,
sociodemographic and clinical features, and age at onset of alcohol use problems using univariate linear regression analysis. Participants of younger age showed significantly higher levels of dissociation as measured by the DES and DES. There was no significant relationship between sex and the level of dissociation.

Severity of alcohol dependence according to the Euro-PASI score was significantly associated with DES and DES-T mean scores, with participants showing greater severity reporting higher levels of pathologic dissociation. There was no evidence that Euro-PASI chronicity of alcohol use was related to DES (β = 0.02; 95% confidence interval [CI], −0.01 to 0.05; β = .11; P = .28) or DES-T (β = 0.01; 95% CI, −0.02 to 0.04; β = .06; P = .56) mean scores, respectively. Significant negative relationships could be consistently observed between DES as well as DES-T mean scores and age at onset of substance abuse problems. More specifically, participants who were younger at first contact with alcohol and at the start of regular alcohol use showed higher levels of dissociation. Participants with higher levels of dissociation also reported having developed tolerance because of ongoing alcohol use at a younger age. Furthermore, participants who were younger when they lost control over their alcohol consumption and when they developed withdrawal symptoms showed higher DES mean scores. A similar pattern of findings was observed for DES-T mean scores.

The level of dissociation was further significantly and positively associated with some types of childhood trauma (Table 3). More specifically, higher CTQ emotional abuse scores were significantly related to higher DES mean scores. This relationship was even stronger for levels of pathologic dissociation. Although CTQ total scores were not significantly associated with DES mean scores, a significant positive relationship was found for CTQ total scores and DES-T mean scores, suggesting that the more childhood trauma participants reported, the higher the level of pathologic dissociation. However, a diagnosis of current PTSD was associated with neither DES nor DES-T mean scores.

The CTQ emotional abuse scores were significantly associated with the DES depersonalization (β = 0.39; 95% CI, 0.14-0.64; β = .30; P = .003) and amnesia subscales (β = 0.34; 95% CI, 0.08-0.61; β = .25; P = .012). A significant relationship was also found for CTQ total scores and the DES amnesia subscale (β = 0.11; 95% CI, 0.03-0.20; β = .28; P = .007). Findings from univariate regression analysis were probed further using hierarchical linear regression analysis. Table 4 shows that the relationship between CTQ emotional abuse and DES mean scores ceased to be statistically significant when age at first loss of control over drinking behavior (as the age at onset variable associated strongest with DES mean scores) was included in the model. However, as can be seen in Table 5, CTQ emotional abuse and age at onset of withdrawal symptoms exerted significant main effects on DES-T mean scores while controlling for age and Euro-PASI severity of alcohol dependence as a priori confounders. There was also evidence for significant main effects of CTQ total scores (β = 0.02; 95% CI, 0.001-0.04; β = .22; P = .043) and age at onset of withdrawal symptoms (β = −0.04; 95% CI, −0.08 to −0.0001; β = −.29; P = .050) adjusted for age and Euro-PASI severity of alcohol dependence.

4. Discussion

The results of our study corroborate the findings of several previous studies, indicating low rates both of general dissociation and of clinically significant dissociation as measured with the DES in samples of primarily alcohol-dependent patients [14-16]. No confounding effect of PTSD status on the level of dissociation was found. A second important finding of our study is the relationship between emotional abuse and dissociative symptoms. Emotional abuse was related to the level of both general (DES) and pathologic (DES-T) dissociative symptoms. At a multivariate level, there was a significant additive effect of the total score of the CTQ on the DES-T score, indicating a more
specific relationship between childhood trauma and pathologic dissociation. Although many studies on dissociation in substance-abusing patients did not consider experiences of emotional abuse, a growing literature indicates that dissociative symptoms may also arise from emotional maltreatment (eg, [7,23,24,40]). Thus, the absence of a relationship between childhood trauma and dissociation in patients with substance-related disorders found in several studies [10,11] may at least partly be explained by an assessment of childhood trauma that was restricted to childhood physical and sexual abuse. As an alternative explanation for the inconsistent findings concerning the trauma-dissociation link in patients with substance-related disorders, differences between the samples studied have been proposed. For instance, in the 2 studies showing a relationship between trauma and dissociation, almost half of the participants were female [18,28]. However, similar to other studies not reporting such a relationship [16], almost 70% of our participants were male. Despite the relationship between childhood trauma and dissociation reported in our sample, it remains to be elucidated as to why the level of dissociative symptoms reported was remarkably low in the face of high prevalence rate of childhood trauma. A potential explanation could be the hypothesis that victims with alcohol dependence may be prone to “chemical” instead of psychologic dissociation [16]. Although this hypothesis is intriguing, it is difficult to test. Ideally, this would require the assessment of dissociation proneness before the onset of traumatic experiences and a prospective assessment of the development of substance-related disorders. Furthermore, this hypothesis does not explain why dissociation seems to be rare in alcohol-dependent patients but not in patients with other substance-related disorders. The latter point suggests that the relationship between trauma and dissociation may be more complex than is sometimes assumed and that there may be a range of other factors that mediate the relationship between childhood trauma and dissociation. For instance, in our study childhood trauma and pathologic dissociation were both related to a younger age at onset of alcohol dependence. Although the association between childhood trauma and younger age of onset has repeatedly been reported in previous studies (eg, [41]), the relationship between dissociative symptoms and earlier onset of alcohol dependence indicates that alcohol-dependent patients with early onset of the disorder are more similar to patients with other substance-related disorders with regard to dissociation. An alternative explanation of the latter association could be the hypothesis Wenzel et al [20] put forward, suggesting that dissociation may be a chronic residual effect of long-term substance abuse. However, this hypothesis was not supported by the findings of both the present study and an earlier one [16], indicating no relationship between dissociation and chronicity of alcohol use. Besides, emotional abuse contributed to pathologic dissociation independent of potential chronic residual effects resulting from early onset of alcohol abuse as well as its chronicity or severity. Finally, the potential influence of acute withdrawal states on dissociative experiences has to be taken into consideration. However, scores of psychiatric symptoms, including dissociation and PTSD, have been reported to be rather elevated in the first weeks of abstinence (eg, [18,42]). For instance, Hodgins et al [18] found that length of abstinence from substances was associated with a decrease in mean DES scores. Effects of acute withdrawal would therefore rather increase the level of reported dissociative symptoms and cannot explain the low levels in our patients. Furthermore, the interviews had been postponed for at least 10 days after admission to avoid such influences.

Although our study goes beyond previous research by taking different forms of childhood trauma and potential influencing factors into account, several limitations have to be considered. First, no structured interviews were conducted to determine the existence of a diagnosis of dissociative disorder. However, it is a common practice to use the DES as a screening instrument for potential dissociative disorders (eg, [11]); and only very few patients would have scored high enough on the DES to receive a structured interview. Another shortcoming of our study is that somatoform manifestations of mental dissociation processes have not been considered [7]. Future studies should include appropriate measures to also cover this type of dissociative symptoms [43]. A further concern could be that similar to other studies focusing on alcohol-dependent patients, the generalizability of the findings is limited to inpatients in a specialized treatment unit for alcohol addiction. It could be argued that sampling bias contributes to the low rates of dissociation, and higher rates may be found in patients with more severe psychopathologic conditions not able to enter this type of treatment. Finally, it would have been of interest to include also patients with other substance-related disorders and to compare them directly with our sample of alcohol-dependent patients. Future studies should therefore include different diagnostic groups and take a wider range of potential mediating factors into account to further clarify the inconsistent findings with regard to dissociation in patients with substance-related disorders.

References

Van den Bosch LCM, Verheul R, Langeland W, Van den Brink W.

Teicher MH, Samson JA, Polcari A, McGreenery CE.

Simeon D, Guralnik O, Schmeidler J, Sirof B, Knutelska M.

Gershuny BS, Thayer JF.

Wenzel K, Bernstein DP, Handelsman L, Rinaldi P, Ruggiero J.

Waller NG, Putnam FW, Carlson EB.

Steinberg M.

Bernstein EM, Putnam FW.

Dunn GE, Ryan JJ, Paolo AM, Van J, Fleet N.

Nijenhuis ERS, Spinphoven P, Van Dyck R, Van der Hart O, Vanderlinden J.


Hodgins DC, Pennington M, el-Guebaly N, Dufour M.

Waller NG, Ross CA.

Hilliard W, Zaudig M, Mombour W.

Zlotnick C, Shea MT, Recupero P, Bidadi K, Pearlstein T, Brown P.

Kokkevi A, Hartgers C.


Briere J, Runtz M.

Roessler TA, Dauber CE.

Zlomnick C, Shea MT, Recupero P, Bidadi K, Pearlstein T, Brown P.

Scher CD, Stein GE, Ryan JJ, Paolo AM, Van J, Fleet N.

Ross CA, Kronson J, Koensgen S, Barman K, Clark P, Rockman G.


Zlomnick C, Shea MT, Recupero P, Bidadi K, Pearlstein T, Brown P.


