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Effect of acute alcohol use on the lethality of suicide attempts in patients with mood disorders

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Abstract

Acute alcohol use is an important risk factor for attempted and completed suicide. We evaluated the effect of acute alcohol intake on the lethality of suicide attempts to test the hypothesis that acute alcohol intoxication is associated with more lethal suicide attempts. This retrospective study included 317 suicide attempters enrolled in mood disorders protocols. Demographic and clinical parameters were assessed. The use of alcohol at the time of the most lethal suicide attempt was determined. On the basis of their responses participants were classified into three groups: participants who reported “Enough alcohol intake to impair judgment, reality testing and diminish responsibility” or “Intentional intake of alcohol in order to facilitate implementation of attempt” were included in the group “Alcohol” (A); participants who reported “Some alcohol intake prior to but not related to attempt, reportedly not enough to impair judgment, reality testing” were included in the group “Some Alcohol” (SA); and participants who reported “No alcohol intake immediately prior to attempt” were included in the group “No Alcohol” (NA). Lethality of the most lethal suicide attempts was higher in the A group compared to the SA and NA groups. Prevalence of patients with alcohol use disorders was higher in the A group compared to the SA and NA groups. SA participants reported more reasons for living and lower suicide intent scores at the time of their most lethal suicide attempt compared to the A and NA groups. Acute alcohol use increases the lethality of suicide attempts in individuals with mood disorders.

Keywords

Alcohol intoxication; Alcohol use disorders; Mood disorders; Suicide; Lethality

1. Introduction

The acute effects of alcohol use act as important risk factors for attempted and completed suicide among individuals both with and without alcohol use disorders (AUD) (Giancola, 2002; Hufford, 2001). Death by suicide is approximately six times as likely in those who are

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alcohol abusers as compared to non-drinkers (Young and Grella, 1998), and many suicide attempts are made while under the influence of alcohol. Aggressive behaviors are more common in suicide attempters suggesting common risk factors and therefore it is noteworthy that there is an association between acute alcohol use and aggression (Bushman and Cooper, 1990; Giancola, 2002; Hufford, 2001; Roizen, 1993). Alcohol is present at the time of the act in 30–70% of suicide attempters, 18–66% of suicide completers, 28–86% of homicide offenders, 24–37% of assault offenders, 7–72% of robbery offenders, 13–60% of sexual offenders, 6–57% of marital violence perpetrators, 13% of child abusers, and 32–54% of child molesters (Roizen, 1993). In addition, the acute effects of alcohol, rather than its chronic effects, appear to have the largest impact on aggressive behavior (Giancola, 2002; Hufford, 2001).

Mood disorders are frequently comorbid with AUD (Conner and Duberstein, 2004; Cornelius et al., 2004, 1996, 2001, 1995; Galaif et al., 2007; Sher, 2006a, 2005; Weiss et al., 1992). People who abuse alcohol commonly become depressed and people with depression often drink alcohol for relief (Weiss et al., 1992). Comorbidity of mood disorders and AUD is associated with higher morbidity due to suicidal behavior (Cornelius et al., 1996, 1995; Sher et al., 2005). Our recent study suggests that patients with comorbid major depression and AUD are younger at their first psychiatric hospitalization, their first major depressive episode, and their first suicide attempt and report more major depressive episodes, suicide attempts, recent life events, and fewer reasons for living compared with patients with major depression without co-occurring AUD (Sher et al., 2008). Another study found that level of suicidality was the symptom which most strongly distinguished between depressed alcoholics and those with either depression or alcohol dependence alone (Cornelius et al., 1995). It has also been reported that alcoholic suicide attempters are more likely to be depressed than non-alcoholic attempters (Chignon et al., 1998). Studies have found that both attempted and completed suicides are more likely to occur during periods of heavy drinking characterized by increased depression (Black et al., 1986; Conner and Duberstein, 2004; Mayfield and Montgomery, 1972). These data provide support for the connection between alcohol intoxication, increased negative emotions, and suicidal behavior.

When intoxicated, people are reported to be more likely to use more lethal means (e.g. a firearm) in suicidal behavior (Brent et al., 1987; Hlady and Middaugh, 1988). To date, no studies have examined the effect of alcohol use on the lethality of actual attempts (i.e., severity of injury sustained, extent of medical intervention, etc.). We therefore evaluated the effect of acute alcohol intake on the lethality of suicide attempts in mood disordered patients to test the hypothesis that acute alcohol intoxication is associated with more lethal suicide attempts.

2. Methods

2.1. Participants

Participants with a history of suicide attempts were selected from a sample of 804 consecutively enrolled research study volunteers in several studies on mood disorders. Participants were recruited through advertising and referrals. Participants gave written informed consent, as approved by the Institutional Review Board. Three hundred and seventeen participants (317) were included in the present analysis.

2.2. Measures

Psychiatric disorders were diagnosed using the Structured Clinical Interview (SCID) for DSM-IV (First, 1997). All participants had a physical examination and routine laboratory screening tests, including urine and blood toxicological screenings to rule out neurological

or medical illness that could affect their mental status. Current severity of depression was assessed by the Hamilton Depression Rating Scale (HDRS; Hamilton, 1960). Lifetime aggression and impulsivity were assessed with the Aggression History Scale Revised (Brown and Goodwin, 1986) and the Barratt Impulsivity Scale (Barratt, 1965), respectively. Hopelessness during the previous week was measured with the Beck Hopelessness Scale (Beck et al., 1974a). A lifetime history of all suicide attempts, including number of attempts, was recorded on the Columbia Suicide History Form (Oquendo et al., 2003). A suicide attempt was defined as a self-destructive act that was committed with some intent to end one's life. The Beck Lethality Rating Scale was used to measure the degree of medical damage caused by the most lethal suicide attempt (Beck et al., 1975). The scale was scored from 0 to 8 (0 = no medical damage, 8 = death), with different anchor points for various suicide attempt methods. The degree of suicide intent for the most lethal attempt was rated with the Suicide Intent Scale (Beck et al., 1975, 1974b). The Scale for Suicide Ideation was used to measure the severity of suicidal ideation during the week prior to index hospitalization (Beck et al., 1979). Reasons for living were evaluated using the Reasons for Living Inventory (Oquendo et al., 2003). Inter-rater agreement and intraclass coefficients were good to excellent.

The use of alcohol at the time of the most lethal suicide attempt was evaluated based on Item 19 of the Suicide Intent Scale, "Relationship between alcohol intake and attempt" (Beck et al., 1975, 1974b). There are four answers to this multiple-choice question: (a) Some alcohol intake prior to, but not related to attempt, reportedly not enough to impair judgment or reality testing; (b) Enough alcohol intake to impair judgment, reality testing and diminish responsibility; (c) Intentional intake of alcohol in order to facilitate implementation of attempt; (d) No alcohol intake immediately prior to attempt.

On the basis of their responses, participants were classified into groups. Comparisons were made of the demographic and clinical characteristics of individuals who consumed alcohol to facilitate implementation of a suicide attempt, and those who consumed enough alcohol to impair judgment. No differences were found between these sub-groups, and therefore data were collapsed into one group named "Alcohol" (A). Those participants who reported "Some alcohol intake prior to but not related to attempt" were included in the group "Some Alcohol" (SA); and participants who reported "No alcohol intake immediately prior to attempt" were included in the group "No Alcohol" (NA).

3. Statistical analysis

The demographic variables Age and Years of Education were compared across alcohol use categories using one-way analysis of variance (ANOVA) with post-hoc contrasts. Comparisons of sex, ethnicity and marital status were computed using Kruskal Wallis Chi-square analyses. Sex was included as a covariate in analyses of clinical data because there was a difference in the sex distribution between the groups. Clinical characteristics of the sample were evaluated by computing separate univariate analyses of covariance (ANCOVA), which included alcohol use category as the independent variable and sex as a covariate. Post-hoc pair-wise comparisons were conducted for each dependent variable using the Bonferroni correction. The incidence of AUD in each of the alcohol use categories was compared using a Kruskal Wallis Chi-square analysis. We also fit a stepwise multiple linear regression model with lethality of the most lethal suicide attempt as the dependent variable, a history of AUD and the three categories of acute alcohol use (i.e., A, SA, and NA) as predictors, and sex as the covariate. Although our assessment of lethality was scored as an ordinal variable (on a scale of severity from 0–8), for the purposes of this analysis it was treated as a continuous variable.

4. Results

Demographic and clinical data are presented in Tables 1 and 2. The sample had a mean age of 37.1 years ($SD = 12.0$, range 18–85) and was 30.3% male, 66.9% White, 22.1% Black, 11.0% Hispanic, and 29% married. All reported a history of a suicide attempt (mean 2.7 lifetime attempts, $SD = 5.3$). 194 (61.2%) met criteria for major depressive disorder and 123 (38.8%) had bipolar disorder. 167 (52.7%) had a history of comorbid AUD. There were 82 participants in the A group, 64 participants in the SA group, and 171 participants in the NA group. There were more females in the NA group compared to the A and SA groups. Prevalence of patients with AUD was higher in the A group compared to the SA and NA groups. SA participants reported more reasons for living and lower suicide intent scores at the time of their most lethal suicide attempt compared to the A and NA groups. Lethality of the most lethal suicide attempts was higher in the A group compared to the SA and NA groups (Table 2). The stepwise multiple regression model demonstrated that only the A group remained in the model ($\beta = 0.14$, $t = 2.51$, $p = 0.12$) which suggested that only the A group contributed significantly to the prediction of lethality of suicide attempts. There was no difference with regard to aggression or depression severity between the three groups.

5. Discussion

A higher prevalence of females in the group that did not use alcohol at the time of suicide attempt suggests that alcohol use plays a less important role in female suicidal behavior than in male suicidal behavior. This is consistent with the fact that most studies find that male suicide victims are more likely than females to have a history of AUD (Brady, 2006; Ohberg et al., 1996; Pirkola et al., 2000) or to have detectable blood alcohol at autopsy (Murphy et al., 1992; Ohberg et al., 1996). It should be noted that men have a higher prevalence of heavy drinking and intoxication than women in the general population, so a higher prevalence of alcohol use among male suicide attempters may not reflect any particular susceptibility among men to any suicide-promoting effects of alcohol.

Prevalence of patients with AUD was higher in the A group compared to the SA and NA groups. This finding could be expected because individuals who frequently drink alcohol are more likely to use alcohol as a part of suicide attempt (Conner and Duberstein, 2004). It has been observed that heavy drinking distinguishes alcoholic suicide victims from comparison groups of alcoholics (Conner and Duberstein, 2004; Cornelius et al., 1996; Murphy et al., 1992). Similar findings have also been reported in attempted suicide among alcoholics (Cornelius et al., 1996; Hasin et al., 1988; Preuss et al., 2003, 2002a, 2002b; Roy et al., 1990). Alcohol dependence has been shown to be a significant risk factor for all types of suicidal behavior (Cornelius et al., 1995; Sher, 2006a, b), with the lifetime risk of suicide in those with alcohol dependence ranging from 7–15% (Brady, 2006; Inskip et al., 1998). On a population level as well, the level of alcohol consumption frequency has been associated with suicide rate, so that the greater the alcohol consumption, the greater the suicide rate (Stack, 2000).

Lethality of the most lethal suicide attempts was higher in the A group compared to the SA and NA groups. The stepwise multiple regression model suggested that only membership in group A contributed significantly to the prediction of lethality of suicide attempts. This finding is consistent with multiple reports suggesting that acute alcohol use plays a significant part in attempted and completed suicides. A review of 16 studies that included data on acute alcohol use and suicide attempts found that on average, 40% of attempters had used alcohol, with some estimates ranging as high as 73%, similar rates of alcohol use were found among completed suicides (Cherpitel et al., 2004). Three studies directly measuring blood alcohol level (Borges and Rosovsky, 1996; McMahon and McGarry, 2001; Suokas

and Lonnqvist, 1995) found a significant association between suicide attempts and recent alcohol consumption. There is some evidence for a dose–response relationship whereby the more alcohol consumed, the greater the risk of suicidal behavior (Borges and Rosovsky, 1996).

Participants who consumed some alcohol (SA group) prior to making their highest lethality suicide attempt reported more reasons for living and lower suicide intent scores compared to the other two groups. Our measurements of suicidal ideation and RFL were often made months or years after the actual event in question, and individuals were asked to recall the role of alcohol use at the time of their most lethal suicide attempt. This finding might indicate a recall bias on the part of individuals with low concurrent suicidal ideation and many reasons for living, in which they down-played the role of alcohol use at the time of their most lethal attempt, or had difficulty linking the attempt to their use of alcohol. The statistical significance of this finding nonetheless indicates the need for further research on the impact of alcohol use on recall of negative life events, and the role of current mood state on recall.

A significant strength of this study is that the original intent of data collection was an examination of suicidal behavior, and thus measures related to suicide attempts were carefully examined and recorded. Besides, our sample of suicide attempters is large and well characterized. An important limitation is that this study includes only participants with mood disorders and, therefore, these results are of limited generalizability to the general population. It is also important to note that this study is retrospective. Another limitation of this study is that we do not have information on the exact amount of alcohol consumed prior to suicide attempt.

In conclusion, our study indicates that individuals with co-occurring mood disorders and AUD more frequently use a significant amount of alcohol prior to their suicide attempts compared to individuals with mood disorders without a history of AUD. The acute alcohol use increases lethality of suicide attempts in persons with co-occurring mood disorders and AUD. This indicates that individuals with co-occurring mood disorders and AUD should be a target for suicide prevention. It is important to educate clinicians and patients with mood disorders about the suicidogenic effect of acute alcohol use on all mood disorder patients, i.e., mood disorder patients with or without AUD.

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Table 1

Demographic characteristics

	Groups						Between group comparisons		
	Alcohol (A) N = 82		Some Alcohol (SA) N = 64		No Alcohol (NA) N = 171				
	Mean	SD	Mean	SD	Mean	SD	Test	P value	Contrast
Age	38.0	11.6	38.0	11.8	36.8	11.4	$F(2,313) = 0.44$	0.64	
Years of education	14.9	2.7	14.5	2.9	14.4	3.0	$F(2,306) = 0.94$	0.39	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%			
Male	34	41.5	22	34.4	40	23.4	$\chi^2(2) = 9.20$	0.01	A > NA [*] SA > NA [*]
Female	48	58.5	42	65.6	131	76.6			NA > A [*] NA > SA [*]
Ethnicity									
White	64	78.0	39	60.9	109	63.7	$\chi^2(4) = 8.32$		0.08
Black	14	17.1	18	28.1	38	22.2			
Hispanic	4	4.9	7	10.9	24	14.0			
Marital status									
Unmarried	61	74.4	46	71.9	118	69.0	$\chi^2(2) = 0.81$		0.67
Married	21	25.6	18	28.1	53	31.0			

* Results are based on two-sided tests assuming equal variances with significance level 0.05.

Table 2

Clinical characteristics

	Groups						Between group comparisons		
	Alcohol (A)		Some Alcohol (SA)		No Alcohol (NA)				
	N = 82		N = 64		N = 171		Test	P value	Contrast
	N	%	N	%	N	%			
Presence of alcohol use disorder	58	70.7	30	46.9	79	46.2	$\chi^2(2) = 14.46$	0.001 [*]	A > SA ^{**} A>NA ^{**}
	Mean	SE	Mean	SE	Mean	SE			
Number of suicide attempts	3.51	0.64	2.20	0.72	2.52	0.45	$F(2,312) = 1.12$	0.329 [*]	
Lethality of the most lethal suicide attempt	3.42	0.20	2.66	0.23	2.90	0.14	$F(2,312) = 3.57$	0.029 [*]	A > SA ^{**} A > NA [*]
Suicide intent at the time of the most lethal suicide attempt	16.43	0.59	14.33	0.66	16.03	0.41	$F(2,312) = 3.20$	0.042 [*]	A > SA ^{**} NA > SA ^{**}
Current Suicidal Ideation	13.77	1.31	10.57	1.51	10.00	0.89	$F(2,273) = 2.87$	0.058 [*]	
Depression	17.59	0.82	16.75	0.03	16.52	0.57	$F(2,309) = 0.58$	0.561 [*]	
Impulsivity	59.95	2.21	54.21	2.59	59.75	1.46	$F(2,269) = 1.92$	0.148 [*]	
Aggression	20.81	0.70	18.81	0.84	20.60	0.49	$F(2,295) = 2.03$	0.132 [*]	
Hopelessness	12.44	0.70	11.08	0.79	12.32	0.47	$F(2,285) = 1.08$	0.341 [*]	
Reasons for living	138.76	5.98	169.80	7.49	143.35	4.21	$F(2,204) = 6.17$	0.002 [*]	SA > A ^{**} SA > NA ^{**}

* Controlled for gender.

** Results are based on two-sided tests assuming equal variances with significance level 0.05. The Bonferroni correction was applied.