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Problematic Alcohol Use and Associated Characteristics Following Bariatric Surgery

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Abstract

Purpose: Evidence suggests that a significant minority of individuals who undergo Roux-en-Y Gastric Bypass (RYGB) experience problematic alcohol and substance use following surgery.

However, little research has examined characteristics, drinking patterns, and possible risk factors within this population. To provide descriptive information of a sample of adults with self-identified alcohol use problems following bariatric surgery, this study examined: (1) alcohol and substance use symptoms using standardized assessments; (2) current and past psychiatric comorbidity; (3) subjective changes in alcohol sensitivity following surgery; and (4) specific patterns of alcohol use prior to and following bariatric surgery.

Materials and methods: Adult participants ($N=26$) completed a series of structured diagnostic interviews and self-report assessments (e.g., Alcohol Use Disorders Identification Test [AUDIT], Michigan Alcohol Screening Test [MAST], Drug Abuse Screening Test [DAST]) by telephone one to four years following a RYGB or sleeve gastrectomy.

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Informed Consent: Informed consent was obtained from all individual participants included in the study.

Human and Animal Rights: All procedures performed were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Results: All participants met objective criteria for current problematic alcohol use based on AUDIT and MAST cut-off scores, reported increased subjective sensitivity to alcohol following surgery, and evidenced significant current and past psychiatric comorbidities, most notably previous major depression (45.5%). Approximately one-third of participants evidenced new-onset Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) alcohol use or dependence following surgery. Preoperative drinking frequencies and quantities were similar to those reported during the period of heaviest postoperative alcohol use.

Conclusions: Findings have implications for pre- and postoperative prevention and intervention efforts. Additional research is needed to further elucidate risk factors for problematic alcohol use following bariatric surgery.

Keywords

postoperative alcohol problems; alcohol use; substance use; comorbidity; psychopathology

Introduction

While bariatric surgery is considered the most effective weight loss intervention for individuals with severe obesity,⁽¹⁾ recent reviews suggest that a clinically significant proportion of individuals experience postoperative problems with alcohol use.⁽²⁾ Gaining a better understanding of this subgroup has potential clinical utility for future prevention and intervention efforts.

With respect to postoperative alcohol use, a large-scale study indicated the prevalence of alcohol use disorders (AUDs) is significant, with one-fifth of patients evidencing AUD symptoms within five years post-surgery, with those who underwent Roux-en-Y Gastric Bypass (RYGB) evidencing twice the risk of AUD symptoms compared to those who underwent laparoscopic adjustable gastric banding (LAGB).⁽³⁾ Furthermore, a subgroup of individuals develop de novo AUDs (3.5–7.0%)^(4–6) and non-alcohol substance use disorders (SUDs).⁽⁷⁾ Moreover, many bariatric surgery centers instruct their patients to avoid alcohol after surgery,⁽⁸⁾ although prior research suggests most patients with pre-surgery alcohol use problems report continued problematic alcohol use following surgery.⁽⁹⁾

Several mechanisms have been postulated to contribute to the increased risk of alcohol and following bariatric surgery and are reviewed elsewhere.^(2, 10) In brief, there is substantial evidence that bariatric surgery, particularly RYGB, is associated with changes in alcohol pharmacokinetics and increased sensitivity to the effects of alcohol.⁽²⁾ It is also possible that altered reward functioning and pharmacokinetic changes together explain processes by which bariatric surgery increases the risk for postoperative alcohol and substance abuse.^(10, 11) However, other potential risk factors that may increase risk for postoperative AUDs are still not well understood. Qualitatively, one previous study of 24 bariatric surgery patients who were treated for SUDs following surgery identified four themes regarding patients' perception of the etiology of substance use problems; 75% of the sample discussed unresolved psychological problems, 83% indicated addiction transfer/substitution, 58% noted increased sensitivity to the effects of alcohol, and 45% reported increased availability of pain medications.⁽¹²⁾

Despite evidence demonstrating the significant risk and clinical relevance of postoperative AUDs, limited research has examined factors related to such problems. Extant evidence suggests that the RYGB procedure, male sex, younger age, preoperative AUDs or regular alcohol use, and preoperative drug use are associated with postoperative AUDs.⁽³⁾ While evidence has been somewhat inconsistent, other research found depression, dysregulated eating (i.e., preoperative food addiction, postoperative nocturnal eating, subjective hunger), family history of substance abuse, poor coping, life stressors, and poorer quality of life were related to initiation of substance use post-surgery,⁽⁷⁾ with some findings being specific to RYGB patients.⁽¹³⁾

In sum, evidence suggests that a significant minority of bariatric surgery patients experience postoperative problems with alcohol use. However, additional assessment of individuals with postoperative alcohol use problems is necessary in order to further understand the experiences of these individuals. Therefore the present study aimed to provide preliminary descriptive information from a sample of individuals with self-identified alcohol use problems following bariatric surgery. The study examined: (1) alcohol and substance use symptoms; (2) psychiatric comorbidity, including eating psychopathology given its theoretical and empirical relevance; (3) subjective changes in alcohol sensitivity; and (4) pre- and postoperative patterns of alcohol use. This study provides unique descriptive data on a sample of bariatric surgery patients that has not previously been reported in the literature.

Methods

Participants

Participants who had undergone RYGB or sleeve gastrectomy and who self-reported problems with alcohol after surgery were recruited from community settings, websites of relevance, and bariatric surgery centers. Interested participants first completed a phone screen to determine eligibility; participants were included who were at least 21 years of age and had RYGB or sleeve gastrectomy in the past one to four years. Both males and females were included.

Procedure

Eligible participants were briefed on the study requirements and completed the informed consent process with study staff via telephone. Participants then completed structured interviews over the phone with a Clinical Master's level assessor and self-report questionnaires on a secure online survey platform. Study procedures received IRB approval.

Interview Measures

The Mini International Neuropsychiatric Interview (MINI)⁽¹⁴⁾ assessed current and past Diagnostic and Statistical Manual of Mental Disorders-IV-Text Revision (DSM-IV-TR) affective and anxiety disorders, and the Structured Interview for DSM-IV-TR Axis I Disorders, Non-patient Edition (SCID-I/NP)⁽¹⁵⁾ assessed current and past DSM-IV-TR eating, alcohol and substance use disorders.

The Alcohol Use Interview (AUI) was designed for the present study, which examined alcohol use history prior to and following surgery, alcohol treatment history, driving when intoxicated, and subjective experiences of drinking alcohol. A timeline follow-back (TLFB) alcohol use calendar was administered, in which participants reported the frequency of alcohol use in the month prior to the assessment.

Self-Report Measures

The Alcohol Use Disorders Identification Test (AUDIT),⁽¹⁶⁾ Michigan Alcohol Screening Test (MAST),⁽¹⁷⁾ and Drug Abuse Screening Test (DAST)⁽¹⁸⁾ measured alcohol and substance use. In addition, participants responded to 17 items from the Hangover and Sensitivity to Alcohol Questionnaire (HSA),⁽¹⁹⁾ which assessed subjective sensitivity to the effects of alcohol prior to and following surgery, as well as questions that assessed family history of alcohol problems, including first-degree blood relatives who were problem drinkers or substance users.

Statistical Analyses

Participants who scored above five on the MAST or above eight on the AUDIT were included in analyses. These cut-off scores have demonstrated adequate sensitivity in detecting harmful drinking behaviors and alcohol use disorders, respectively.^(20, 21) Descriptive statistics were evaluated for all measures. Due to the limited sample size, other tests of statistical inference were not conducted. In addition, though the screening process confirmed the presence of either RYGB or gastric sleeve bariatric surgery, the type of surgery was not reported, and thus comparisons between surgery types was not possible.

Results

A total of 26 participants completed the present study; however, sample size varied across measures (i.e., MINI/SCID: $n=20-22$; AUDIT: $n=22$; MAST/DAST: $n=26$; TLFB: $n=22$, AUI: $n=21-22$; HAS: $n=25-26$). The majority of participants were female (84.6%), employed full-time (73.1%), and had completed a college degree (65.4%). Participants ranged in age from 27 to 60 years ($M=43.65$, $SD=10.52$). Most participants identified as Caucasian (80.8%); 11 (42.3%) participants were currently married or re-married; 5 (19.2%) were never married; 5 (19.2%) were divorced and were not currently married; and 5 (19.2%) were living with a partner but were not currently married.

Table 1 displays descriptive statistics for the AUDIT, MAST, and DAST. All 26 participants met entry criteria based on AUDIT and MAST scores, suggesting problematic alcohol use. Seven participants scored at or above six on the DAST, indicating the presence of substance use problems. As shown in Table 2, 12 participants met criteria for either current DSM-IV alcohol abuse or dependence, and 12 participants reported lifetime history of alcohol abuse or dependence. Seven participants reported no lifetime history of alcohol abuse or dependence, but met criteria for current abuse or dependence (i.e., de novo onset). Table 3 displays AUDIT, MAST, and DAST scores for participants with de novo diagnoses compared to those with continued or no diagnoses prior to and following surgery; means reflect a trend for the continued use group to report higher scores on the MAST and DAST,

although the de novo group reported the highest scores on the AUDIT compared to other groups. With respect to psychiatric comorbidity, several participants reported current mood and anxiety disorders ($n=8$); 10 reported lifetime depression diagnoses, and five reported a history of lifetime threshold and subthreshold eating disorder diagnoses. Regarding treatment history, while only one participant reported detoxification treatment prior to surgery, following surgery eight participants reported receiving treatment for alcohol use. Additionally, 15 participants reported having a first-degree blood relative who was a problem drinker, the majority of whom were a parent ($n=12$).

Drinking experiences and behaviors prior to and following surgery assessed are shown in Tables 1 and 2. Participants reported their typical pattern of alcohol use was drinking, on average, three days per week before surgery and consuming 7.5 drinks on such occasions; however during the six months prior to surgery, they reported drinking one day per week and consuming 2.76 drinks on such occasions. During the month preceding the study participants reported drinking between 11 and 13 drinks per week. Participants reported drinking alcohol for the first time approximately five months following surgery. Participants rated their first postoperative drinking experience as generally neutral, and a substantial proportion (40.9%) reported becoming intoxicated at that time. Participants reported their heaviest postoperative use occurred on average, 71.05 $\pm$ 58.66 weeks following surgery. During this time participants reported consuming alcohol three to four days/week (approximately seven drinks/day); approximately one-third of participants also reported driving while intoxicated during this time. All participants reported that prior to surgery it took at least two drinks to feel effects; however, approximately half of participants reported feeling effects after one or less drinks following surgery. Many participants reported drinking alcohol before eating (42.3%), and not waiting at least 30 minutes after eating to drink alcohol (38.5%) after surgery.

Discussion

The present study examined alcohol and substance use symptoms and behaviors, psychiatric comorbidity, and subjective sensitivity to alcohol among a sample of participants who self-reported problems with alcohol use following RYGB or sleeve gastrectomy. Results indicated all participants met objective criteria for problematic alcohol use, with notable current and past psychiatric comorbidities. Furthermore, it appears that participants experienced increases in subjective sensitivity to alcohol following surgery, though drinking frequency and quantity evidenced less change over time.

Participants' first postoperative experience drinking alcohol occurred approximately five months after surgery. Although all participants demonstrated current problematic alcohol use on continuous measures, a smaller proportion met criteria for current alcohol abuse or dependence diagnoses using the SCID, and no participants met criteria for current substance use diagnoses. Thus, it is possible that structured interview methods underestimate alcohol and substance use problems, as suggested by prior study of this population.⁽⁴⁾ In addition to current problematic alcohol use, approximately one-fourth of the sample reported problematic non-alcohol substance use. While approximately one-third of participants reported de novo alcohol use or dependence following surgery, it is notable that a substantial

proportion of participants also reported lifetime histories of alcohol and substance use diagnoses, with the majority demonstrating past alcohol abuse or dependence. Assessment of preoperative drinking frequency indicated that, on average, participants drank alcohol regularly, and consumed significant amounts of alcohol on such occasions. Furthermore, the majority of participants reported a family history of alcohol use problems.

Despite lower drinking frequencies during the months prior to surgery, it is also notable that average preoperative drinking frequencies were similar to those that participants reported during the period of heaviest postoperative alcohol use (which occurred approximately 18 months after surgery), suggesting that participants generally returned to preoperative drinking frequencies. Yet despite returning to pre-surgery drinking frequencies, more individuals sought treatment for alcohol problems after surgery than before, which may reflect that the impact of alcohol use on functioning was more significant following surgery. Thus, future study is needed to address the degree of impairment associated with different levels alcohol use in post-surgery bariatric samples, and it may be necessary to lower AUD/SUD frequency thresholds on the SCID and rather focus on levels of impairment when assessing for these diagnoses.

It also appears that some participants did not regularly adhere to other postoperative guidelines. A substantial proportion of participants reported that after surgery drinking alcohol before eating and not waiting at least 30 minutes after eating to drink alcohol. These results may indicate a need to more strongly emphasize such recommendations during preparation for surgery and postoperative follow-up.

Most participants also reported experiencing a heightened subjective sensitivity to the effects of alcohol following surgery. While based on self-report, these findings are consistent with prior research documenting pharmacokinetic changes and increased sensitivity to alcohol following bariatric surgery.⁽²⁾ It is also notable that many participants reported becoming intoxicated during their first postoperative experience drinking alcohol, which may be related to increased sensitivity, and suggest alcohol use could be a safety concern given that one-third of participants reporting driving while intoxicated.

A minority of participants evidenced concurrent mood and anxiety disorders, and over half of participants met criteria for lifetime mood disorder diagnoses, most commonly depression, and approximately one-fifth of the sample reported lifetime threshold and subthreshold eating disorders. However, given that it was not possible to compare participants to a group of matched post-surgery bariatric patients without alcohol use problems, the present results do not elucidate if and how these comorbidities may be elevated in this group. Further research is needed to compare psychiatric comorbidities between those with and without alcohol use problems, and prospective research may be warranted to investigate whether a history of depression and/or eating psychopathology represent risk for engaging in problematic alcohol or substance use following surgery.

It is important to note limitations of this study. Most importantly, the lack of matched control group prevents inferences about the relationship between variables assessed in this study and postoperative drinking problems. While the screening process confirmed the presence of

either RYGB or gastric sleeve bariatric surgery, the type of surgery was not reported, and thus descriptive comparisons in variables between surgery types was not possible. In addition, combining surgery types in this sample may have diluted inferences that can be drawn from results. The sample size and the self-selection of the sample limit generalizability of results and precluded tests of statistical inference and comparisons between procedure types. Thus, further research is necessary to examine these domains in larger samples obtained through other methodologies. Participants were assessed at one time point, and therefore data regarding pre-surgery drinking may be subject to retrospective reporting biases. Although diagnoses were made via structured interviews, most results were based on self-report assessments. The sample was also predominantly female with high levels of education and employment, so it is unclear whether findings generalize to other demographic groups or males, who are at higher risk for postoperative AUDs.⁽³⁾

Despite these limitations, this study offers unique descriptive data characterizing a sample of patients who experienced alcohol use problems following bariatric surgery. To the authors' knowledge, detailed information about patterns and experiences of alcohol use pre- and post-surgery has not been previously reported for this population. As expected, participants evidenced clinically significant postoperative alcohol use, as well as increased subjective sensitivity to the effects of alcohol. Many participants reported a family history of alcohol problems, histories of alcohol and substance use, depression, and to a lesser extent, eating psychopathology. Perhaps most importantly, results demonstrated many participants returned to preoperative drinking frequencies, and many did not alter drinking behaviors according to recommended guidelines. Taken together, results are consistent with previous research demonstrating increased physiological sensitivity to alcohol, and while the lack of comparison group limits conclusions that can be drawn from this sample, results nevertheless suggest that further investigation is warranted to identify psychological and behavioral risk factors for postoperative alcohol use problems. At a minimum, these findings highlight the need for thorough preoperative assessment and education, as well as ongoing assessment of alcohol use in the postoperative period.

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Table 1

Descriptive statistics and drinking behaviors prior to and following surgery

Time period assessed	Measure	<i>n</i>	<i>M</i>	<i>SD</i>
Current	AUDIT	22	21.91	6.60
	MAST	26	6.42	4.13
	DAST	26	4.77	2.96
Past month	TLFB			
	Total drinks in past month	22	49.78	63.97
	Week 1	22	12.79	15.77
	Week 2	22	11.15	14.08
	Week 3	22	12.80	17.55
	Week 4	22	13.05	17.34
Pre-surgery (overall)	AUI			
	Drinking frequency (days/week)	21	3.00	2.57
	Drinking frequency (drinks/day)	20	7.50	7.05
Pre-surgery (6 months prior to Surgery)	Drinking frequency (days/week)	21	1.02	1.47
	Drinking frequency (drinks/day)	21	2.76	2.19
First post-surgery experience with drinking alcohol	AUI			
	Weeks after surgery	21	20.81	19.64
	Ounces consumed	22	14.14	21.38
	Subjective experience (1=negative;7=positive)	22	3.73	1.12
			<i>n</i>	%
	Became intoxicated	Yes	9	40.9
		No	13	59.1
Heaviest alcohol use post-surgery	AUI	<i>n</i>	<i>M</i>	<i>SD</i>
	Weeks after surgery	21	71.05	58.66
	Drinking frequency (days/week)	22	3.66	2.37
	Drinking frequency (drinks/day)	22	7.23	8.04
			<i>n</i>	%
	Driven while intoxicated	Yes	1	31.8
		No	15	68.2

Note. AUDIT= Alcohol Use Disorders Identification Test; MAST= Michigan Alcohol Screening Test; DAST= Drug Abuse Screening Test; TLFB= Timeline follow -back alcohol use calendar; AUI= Alcohol Use Interview. Problematic alcohol use was defined by scores above five on the MAST and/or above eight on the AUDIT.

Table 2

Pre- and post-surgery psychiatric diagnosis and drinking behaviors

		Current		Past	
Psychiatric diagnoses (<i>n</i> =22)		<i>n</i>	%	<i>n</i>	%
Alcohol abuse ^a		5	25.0	5	22.7
Alcohol dependence		7	31.8	8	36.4
Anxiolytic abuse		0	0	1	4.5
Anxiolytic dependence		0	0	1	4.5
Cannabis abuse		0	0	1	4.5
Cannabis dependence		0	0	2	9.1
Stimulant dependence		0	0	1	4.5
Opioid dependence		0	0	1	4.5
Cocaine dependence		0	0	1	4.5
Anorexia nervosa (subthreshold)		0	0	2	9.1
Bulimia nervosa (subthreshold)		0	0	1	4.5
Bulimia nervosa (threshold)		0	0	1	4.5
Binge eating disorder (threshold)		0	0	1	4.5
Major depression		2	9.1	10	45.5
Dysthymia		1	4.5	1	4.5
Generalized anxiety disorder		2	9.1	<i>b</i>	<i>b</i>
Panic disorder		1	4.5	2	9.1
Agoraphobia		1	4.5	1	4.5
Social anxiety disorder		1	4.5	<i>b</i>	<i>b</i>
HSA		Pre-surgery		Post-surgery	
How much alcohol did it take for you to feel the effects?	<1 drink	0	0	6	23.1
	1 drink	0	0	8	30.8
	2 drinks	5	19.2	7	26.9
	3 drinks	5	19.2	2	7.7
	4 drinks	6	23.1	2	7.7
	>4 drinks	10	38.5	1	3.8
Since bariatric surgery when you drink do you typically do so before you eat?	No	---	---	11	42.3
	Yes	---	---	15	57.7
Since bariatric surgery when you drink do you typically do so while you are eating? ^c	No	---	---	6	23.1
	Yes	---	---	19	73.1
Since bariatric surgery when you drink do you typically do so at least 30 min after you have eaten? ^c	No	---	---	10	38.5
	Yes	---	---	15	57.7

Note. HSA=Hangover and Sensitivity to Alcohol Questionnaire.

^aBased on *N*=20^bData not available^cPost-surgery: *n*=25

Table 3

Alcohol and substance use levels among participants with continued, de-novo, or absent diagnoses prior to and following

Measure	Group ^I	<i>n</i>	<i>M</i>	<i>SD</i>
AUDIT	Continued diagnosis	9	23.22	6.14
	De novo diagnosis	4	29.00	6.22
	No diagnosis	5	18.40	4.22
MAST	Continued diagnosis	9	6.78	3.83
	De novo diagnosis	4	5.50	2.38
	No diagnosis	5	3.80	1.30
DAST	Continued diagnosis	9	5.67	3.71
	De novo diagnosis	4	3.75	1.50
	No diagnosis	5	3.00	0.71

Note. AUDIT= Alcohol Use Disorders Identification Test; MAST= Michigan Alcohol Screening Test; DAST= Drug Abuse Screening Test.

^IGroup was defined based on SCID diagnoses: continued diagnosis=presence of alcohol abuse/dependence prior to and following surgery; de no diagnosis=no alcohol abuse/dependence prior to surgery with a diagnosis following surgery; no diagnosis=no alcohol abuse/dependence prior to or following surgery.