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Binge eating disorder, impulsivity and bipolar spectrum features in a sample of obese candidates for bariatric surgery

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Summary. Aims. Candidates for bariatric surgery are routinely screened for psychiatric disorders because abnormal eating behaviors are considered common among these patients. This study aimed to evaluate the frequency and persistence, in terms of one month-to-lifetime prevalence ratio, of binge eating disorder (BED) and the potential association with impulsivity features and bipolar spectrum comorbidity in a sample of obese patients undergoing a psychiatric evaluation for bariatric intervention. **Methods.** Overall, 80 candidates to bariatric surgery were assessed consecutively over 12 months within the framework of a collaboration between the University of Pisa Psychiatry and Internal Medicine Departments. Patients were evaluated through structured clinical interviews and self-report questionnaires. **Results.** The lifetime and last-month frequencies of BED according to DSM-5 criteria were 46.3% and 17.5%, respectively, with a prevalence ratio of 37.8%. Rates of formal bipolar disorder diagnoses were extremely low in patients with or without BED. However, patients with BED showed more severe dyscontrol, attentional impulsivity and bipolar spectrum features than patients with no BED. **Conclusions.** The relationship of BED, impulsivity, and mood disorders in bariatric patients is more complex than usually reported in the literature. In particular, the presence of bipolar spectrum features should be systematically investigated in these patients because of their essential clinical and therapeutical implications.

Key words. Bariatric surgery, binge eating disorder, bipolar spectrum, DSM-5, impulsivity, obesity.

Disturbo da binge-eating, impulsività e caratteristiche di spettro bipolare in un campione di pazienti obesi candidati alla chirurgia bariatrica.

Riassunto. Scopo. Nei candidati alla chirurgia bariatrica viene routinariamente valutata la presenza di disturbi psichiatrici, poiché in questo tipo di pazienti sono comuni comportamenti alimentari anomali. Lo scopo di questo studio è valutare la frequenza e la persistenza, in termini di rapporto tra prevalenza nel corso dell'ultimo mese e della vita, del disturbo da binge eating (DBE) e l'associazione con caratteristiche di impulsività e spettro bipolare in un campione di pazienti obesi sottoposti a valutazione psichiatrica prima dell'intervento bariatrico. **Metodi.** Ottanta candidati sono stati valutati consecutivamente durante un periodo di 12 mesi nel contesto di una collaborazione tra i Dipartimenti di Psichiatria e di Medicina Interna dell'Università di Pisa. I pazienti sono stati valutati tramite interviste cliniche strutturate e questionari di autovalutazione. **Risultati.** Le prevalenze del DBE secondo i critreri del DSM-5 nel corso della vita e nell'ultimo mese sono state, rispettivamente, del 46,3% e del 17,5%, con un rapporto di prevalenza del 37,8%. I tassi di diagnosi formale di disturbo bipolare sono risultati molto bassi nei pazienti con o senza DBE. Tuttavia, pazienti con DBE hanno presentato maggiori discontrollo, impulsività attentiva e caratteristiche di spettro bipolare rispetto ai pazienti senza DBE. **Conclusioni.** La relazione tra DBE, impulsività e disturbi dell'umore in pazienti bariatrici è più complessa di quanto descritto in letteratura. In particolare, la presenza di caratteristiche di spettro bipolare dovrebbe essere sistematicamente indagata in questi pazienti in ragione delle importanti implicazioni cliniche e terapeutiche.

Parole chiave. Chirurgia bariatrica, disturbo da binge-eating, DSM-5, impulsività, obesità, spettro bipolare.

Introduction

Overweight and obesity are abnormal or excessive fat accumulation that represents a health risk. Bariatric surgery is considered one relevant possible response in those cases with inadequate weight reduction percentage or danger to patient's life due to the severity of obesity and associated conditions. Bariatric surgery, in fact, reduces overall mortality, due to cardio-vascular as well as any other cause, and can improve obese patients' overall quality of life[1]. Notwithstanding, eating disorders symptoms and mood disorders are frequent in individuals candidate for bariatric surgery[2]. Still, their reciprocal relationship, as well as with body mass index, is not clear (table 1)[3-9].

Binge eating disorder (BED) can occur in individuals with or without obesity. Although individuals requiring overweight/obesity treatments often show this associated condition, BED is a distinct entity. Most available studies on the frequency of BED

Table 1. Prevalence of lifetime (LT) and last-month (curr) psychiatric disorders in bariatric surgery candidates in clinical settings.

Authors (n=overall sample)	Prevalence*						
		Psychiatric Disorders	Major Depression	Bipolar Disorder	Anxiety Disorders	ED	BED
Fisher et al.[3] (n=8192)	LT	57.0	50.0	6.0	-	-	-
	Curr	-	-	-	-	-	-
Duarte-Guerra et al.[4] (n=393)	LT	80.9	27.5	35.6	54.7	35.1	29.8
	Curr	57.8	6.9	13.7	46.3	20.1	16.5
Mitchell et al.[5] (n=190)	LT	68.6	38.7	-	31.7	26.6	13.1
	Curr	33.7	7.0	-	18.1	11.1	10.1
Mühlhans et al.[6] (n=146)	LT	72.6	50.7	-	21.2	50.0	NA
	Curr	55.5	25.3	-	15.1	37.7	23.3
Mauri et al.[7] (n=282)	LT	37.6	22.0	-	18.1	12.8	11.0
	Curr	20.9	6.4	-	12.4	7.1	6.7
Kalarchian et al.[8] (n=288)	LT	66.3	42.0	3.5	37.5	29.5	27.1
	Curr	37.8	10.4	1.7	24.0	16.3	16.0
Rosenberger et al.[9] (n=174)	LT	36.8	22.4	-	15.5	13.8	4.6
	Curr	24.1	10.9	-	11.5	10.3	3.4

All values are percentages.
Legend: ED= Any Eating Disorder; BED= Binge Eating Disorders.
*Prevalence is referred to the population indicated in each clinical settings.

diagnosis in bariatric patients are still based on the Diagnostic and Statistical Manual of Mental Disorders, fourth version text-revised (DSM-IV-TR) criteria[10], which were more strict than Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5)[11]. The essential features of BED, according to DSM-5 criteria[12], are the recurrent episodes of binge, that is, eating large amounts of food within a limited time while experiencing feelings of loss of control, that must be present on average once a week for 3 months (compared to 2 times per week for 6 months required by the DSM-IV-TR). Less restrictive criteria determined a slight increase in rates of BED patients detected within surgical-seeking cohorts, but individuals' psychopathological characteristics seemed similar to the ones identified by old criteria[13]. Therefore, new criteria are equally useful in identifying patients with high levels of psychopathology, independent from the frequency of binge behaviors[14,15]. Individuals with BED often have a more functional impairment, lower quality of life, and higher rates of psychiatric comorbidity.

Although the term "impulsivity" is not used within DSM-5 diagnostic criteria for BED, its role in the context of binge eating symptoms in obese individuals seems clinically relevant for several reasons. Barratt suggested that there are three impulsivity subtraits: an "ideomotor" impulsiveness, involving acting without thinking, a "careful planning" subtrait involving attention to details, and a future orientated "coping stability" subtrait[16]. In an earlier analysis, the items had been divided into attentional, motor, and non-planning factors[17]. Binge eating is one of the psychopathological aspects in which impulsivity is clearly involved[18]. First, impulsive tendencies may increase the likelihood of binge eating and purge while potentially having a lower impact on other eating disorder behaviors (e.g., fasting). Second, impulsivity may eventually influence the co-occurrence of additional maladaptive behaviors that may negatively impact an individual's adaptation to the post-bariatric surgery phase[19]. Third, impulsivity is reported to be associated with bipolar features, particularly attentional impulsivity, worsening both courses of illness and comorbidities[20]. Besides, the association of general impulsivity features with BED might entail a more severe disorder subtype, worsened by broader psychopathology[21]. Therefore, exploring the role of impulsivity concerning BED in obese patients may provide additional relevant information to understanding the phenomenology of obesity, as well as various aspects of the treatment process. An additional problem occurring with candidates for bariatric surgery, as summarized in table 1, is the strikingly low frequency of bipolar disorders in these individuals.

In some studies, rates of bipolar disorders in clinical samples dichotomized into BED and non-BED groups were virtually absent in both populations[11]. Only Duarte-Guerra et al.[22] found high lifetime rates (35.6%) of bipolar disorders in their Brasilian sample; however, current frequencies were much lower (13.7%), making it difficult to understand the actual impact of bipolar conditions on the pre-bariatric status. These data contrast what is commonly seen in routine clinical practice, with patients frequently reporting periods of mood symptoms of opposite polarity throughout life with rare euthymic phases, often occurring in the context of a disorganized dietary lifestyle (numerous failed restrictive dietary attempts alternated with periods characterized by loss of control on food assumption).

This study aimed to evaluate the frequency of binge-eating features in a sample of obese patients recruited over 1 year undergoing a diagnostic evaluation protocol for bariatric intervention. The additional important aim was to evaluate whether BED was associated with impulsivity sub-traits and some bipolar mood spectrum features potentially related to impulsivity.

Methods

Participants

Eighty subjects candidate for bariatric surgery have been recruited among patients hospitalized in an Internal Medicine Department setting and consecutively sent to the Psychiatry Department for psychiatric evaluations within the framework of a collaborative protocol to screen and follow obese patients candidates for bariatric surgery. Patients were assessed through a psychometric battery containing structured and semi-structured clinical interviews and self-report instruments. Patients who fulfilled exclusion criteria for bariatric surgery (alcohol or substance addiction, severe psychotic symptoms) were not recruited. During the psychiatric interview, relevant behavioral habits, such as substance consumption (tobacco, caffeine, and subclinical alcohol use) were checked with the patient. Body weight and obesity grade index were registered at hospitalization. Anthropometric measurements were assessed using standard calibrated instruments. Height (m) was measured using a wall-mounted stadiometer; weight (kg) using electronic scales with an upper weight limit of 300 kg. Body mass index (BMI) was calculated as weight/height. Medical comorbid conditions were checked and listed as provisional until completion of pre-surgical diagnostic protocol. Demographic and anthropometric data have been registered, along with psychiatric history variables, past and ongoing treatment, and family comorbidity. The present study was carried out according to the Declaration of Helsinki. Written informed consent was obtained from all study participants. The competent ethics committee of the University of Pisa approved the study.

Psychometric evaluation

BED and Eating Spectrum Disorders Assessment

Enrolled patients have been evaluated according to DSM-5 diagnostic criteria through a psychiatric interview conducted by two investigators. The Boston Interview for Gastric Bypass was also used. This instrument is a semi-structured interview for the pre-surgical evaluation of gastric bypass candidates. Furthermore, we administered the Anorexic-Bulimic Spectrum - Self Reported (ABS-SR), a self-report questionnaire that allows the detection of both full-blown and subthreshold characteristics of eating disorders[23]. The ABS-SR consists of 134 items, coded as present or absent for one or more periods of at least 3-5 days through the subject's lifetime or over the past week or month, and collapsed into nine domains: 1) attitudes and beliefs; 2) weight history; 3) self-esteem and satisfaction; 4) phobias; 5) avoidant and compulsive behaviours; 6) weight maintenance; 7) eating dyscontrol; 8) associated features and consequences; 9) impairment and insight.

Mood Disorders Assessment

Patients were also evaluated with the Mood Spectrum-Self Reported (MOODS-SR) to assess the components of both mood polarities, encompassing symptoms, traits, and broader lifestyles, allowing to characterize the affective dysregulations at the core of mood disturbances[24]. This self-report instrument, derived from the corresponding structured interview, explores features associated with mood disorders. It focuses on the presence of manic and depressive symptoms, traits, and lifestyles that may characterize the "temperamental" affective dysregulations that make-up fully syndromal and subthreshold mood disturbances. The MOODS-SR consists of 161 items, coded as present or absent for one or more periods of at least 3 to 5 days through the subject's lifetime. Four mania/hypomania factors (psychomotor activation, mixed instability, mixed irritability and euphoria) plus one factor (Mysticism/Psychoticism) were derived in a factor analysis of 68 mania/hypomania spectrum items[25].

Impulsivity assessment

All participants completed the Barratt Impulsiveness Scale (BIS-11)[16]. The BIS-11 consists of 30 items, which participants rate on a 4-point scale: Rarely/

Never (=1), Occasionally (=2), Often (=3), and Almost Always/Always (=4). The BIS-11 is a widely used and well-validated self-report scale for impulsiveness, and measures attentional impulsiveness (inability to focus attention), motor impulsiveness (acting without thinking), and non-planning impulsiveness (lack of orientation to the future). Sample items are: "I am restless at the theater or lectures" (Attentional Impulsiveness); "I buy things on impulse" (Motor Impulsiveness); "I plan tasks carefully" (Non-planning Impulsiveness). The scale has been validated in several languages and showed good psychometric properties[26].

Statistical analyses

Comparisons among groups on categorical variables were performed by the chi-square tests. For continuous variables, t tests were performed. Some investigated variables were not normally distributed; therefore, non-parametric analyses were also performed. The Mann-Whitney U-test was used to compare the mean scores of the MOOD-SR. After computing the frequency estimated for current (1-month) and lifetime disorders, we calculated the prevalence ratio (PR) to define the one-month-to-lifetime (1M/LT) persistence of disorder groups. This PR represented a proxy indicator of morbidity persistence and was ascertained by dividing the percentage of current disorders by lifetime disorders[22,27]. Possible values range from 0 to 100, and greater figures correspond to more persistent patterns.

The significance level was set at p<.05. To control for type-I error related to multiple testing of mood spectrum domains and Barratt's scores, Bonferroni-Holm correction was applied to the significance level. The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20.1[28].

Results

The mean age of the sample was 43.5 years (±11.5), and 33.8% were males. Overall, 47.5% had no children, 58.8% were married, and 28.8% were single. Considering the level of education, 46.3% of the sample had an upper secondary and 35% a lower secondary degree. Sixtyfive% of patients were employed, 20% were housewives, 8.8% were retired and 6.3% were unemployed. The BMI values and rates of medical comorbidity in the overall sample of candidates for bariatric surgery are reported in table 2.

Frequencies of lifetime and current (last-month) single psychiatric diagnoses are reported in table 3.

The most frequent diagnoses were BED, either lifetime and current, followed by depression and, lastly, bipolar disorder. The prevalence ratio of BED was 37.8 (range 1-100).

Table 2. Body Mass Index and medical comorbidity of a sample of candidates to bariatric surgery (n=80) recruited. over a 12-month period.

Comorbidity/Complication	N (Percentage)
Hypertension	35 (43%)
Dyslipidemia	25 (31%)
Diabetes Type 2	17 (21%)
Metabolic Syndrome	30 (38%)
Gastroenterological	58 (73%)
Steatosis	48 (60%)
Cardiocirculatory	36 (45%)
Thyreopathy	25 (31%)
Orthopedic	14 (18%)
Others	13 (16%)
OSAHS/Restrictive syndrome	14 (18%)
Mean BMI (Kg/m2)	*SD*
45 (min 31-max 77)	7.65
Obesity Grade	*N (Percentage)*
I	2 (3%)
II	16 (20%)
III	44 (55%)
IV	16 (20%)
V	2 (3%)
Previous Bariatric Surgery	18 (23%)

As reported in table 4, ABS-SR scores show a statistically significant difference for the BED group compared to the no-BED group on the "Avoidant and Compulsive Behaviors" (p<.05) and "Eating Dyscontrol" (p<.02) domains.

Table 5 reports scores on BIS-11 three higher-order factors (Attentional Impulsivity, Motor Impulsivity, Non-planning Impulsivity) and MOODS-SR subscales in BED versus no-BED groups. Non-planning impulsivity scores were higher in the BED group than in the no-BED group (p<.05).

Discussion

In this study, a group of individuals candidate for bariatric surgery was evaluated to detect a potential relationship between the presence of BED and impulsivity and bipolar spectrum features. Patients with BED showed higher scores in the "eating dyscontrol" domain of ABS-SR, in the "attentional impulsivity" domain of BIS-11 as well as in one MOODS-SR domain related to mood instability ("mixed instability"). When a linear regression model was performed, psychomotor activation, mixed instability and impul-

Table 3. Frequency of psychiatric disorders and persistence (prevalence ratio[a]) in a sample of candidates for bariatric surgery (n=80).

Current DSM-5[b] Diagnosis	N (%)	**Lifetime DSM-5[b] Diagnosis**	N (%)	**1M/LT[a]**
Overall Diagnosis	14 (17.5)	Overall Diagnosis	41 (51.3)	34.1
Major Depressive Episode	2 (2.5)	Major Depression Disorder	39 (48.8)	5.12
Hypomania/Mania	0	Hypomania/Mania	12 (15.0)	0
Panic Disorder	5 (6.3)	Panic Disorder	10 (12.5)	50.4
Binge Eating Disorder	22 (27.5)	Binge Eating Disorder	37 (46.3)	59.4
Bipolar Disorder	3 (3.8)	Bipolar Disorder	9 (11.3)	33.6

[a]1M/LT: One month-to-lifetime prevalence ratio (PR) to denote persistence. This PR represented a proxy indicator of morbidity persistence and was ascertained by dividing the percentage of current disorders by lifetime disorders. Possible values range from 0 to 100; the more significant the figure, the more persistent the pattern is.

Table 4. Scores on domains of Anorexic-Bulimic Spectrum-Self Reported (ABS-SR) in a sample of candidates for bariatric surgery with or without Binge Eating Disorder (BED) (n=80).

ABS-SR Domains	**BED (n=37)**	**No BED (n=43)**	**t value**	**C.I.**	**Sig.**
1. Attitudes and Beliefs	1.79 ± 1.2	2.04 ± 1.8	0.618	79	0.539
2. Weight History	1.97 ± 1.3	1.8 5± 0.9	-0.276	79	0.784
3. Self-Esteem and Satisfaction	4.45 ± 2.2	5.00 ± 3.1	0.628	79	0.533
4. Phobias	8.72 ± 3.3	7.00 ± 3.2	-1.378	79	0.174
5. Avoidant and Compulsive Behaviors	2.28 ± 1.1	1.48 ± 0.9	-1.968	79	0.047
6. Weight Maintenance	6.31 ± 2.2	5.48 ± 2.3	-0.780	79	0.439
7. Eating Dyscontrol	9.48 ± 3.4	6.07 ± 2.3	-2.583	79	0.013
8. Associated Features and Consequences	4.21 ± 2.1	3.11 ± 1.6	-1.679	79	0.099
9. Impairment and Insight	1.24 ± 1.1	0.96 ± 0.8	-0.681	79	0.499

sivity, but not a history of depression and eating dyscontrol, independently predicted BMI at the index episode, suggesting a complex interaction between the domains considered.

The population of patients candidate for bariatric surgery was substantially similar, in terms of sociodemographic characteristics and burden of comorbid medical pathology, to other samples described in bariatric surgery literature[4,7,29-31]. Frequency rates of lifetime DSM-5 BED diagnosis were also in line with the previously reported ones (table 1).

In our sample, one month-to-lifetime PR of BED was about 60, even higher than that (55.6) reported by Duarte-Guerra et al.[4]. This high PR reflects symptomatology's apparent tendency to persist over time. This may be particularly true adopting the less stringent diagnostic DSM-5 criteria for BED, compared to the DSM-IV (namely, the reduction in the frequency of binge episodes from 2 times per week for 6 months required by the DSM-IV-TR to an average of one episode weekly for 3 months of the DSM-5).

Impulsivity measures, intuitively linked to the construct of eating dyscontrol, have been studied extensively in the literature and included as relevant explanatory factors in different obesity models, from food addiction to self-control depletion (as caused by negative affect and restraint)[32-35]. Our data, although obtained in a relatively small sample, corroborate the notion that a tendency to lack of control over eating behavior is common among bariatric patients before surgery[36-40]. However, the relationship between binge eating behavior, impulsivity and mood symptomatology is complex. Although the term "impulsivity" is generally reported in literature as an implicit feature of BED, strictly speaking, it is not mentioned among the DSM-5 diagnostic descriptors for the disorder. Therefore, impulsivity should be regarded as an "additional" independent psychopathological feature in obese patients with BED. In our study, data obtained from the Barratt Scale seem to indicate a significant higher tendency to attentional impulsivity (inability to focus attention or concentrate) in subjects with

Table 5. Barratt Scale Impulsivity Domains and MOODS-SR scores in a sample of candidates for bariatric surgery (n=80) with and without Binge Eating Disorder (BED).

	Lifetime BED (n=37)	No-Lifetime BED (n=43)	U	Sig.
Barratt Impulsivity Scale				
Attentional Impulsivity	18.3 ± 4.2	12.9 ± 3.1	501.0	0.124
Motor Impulsivity	22.9 ± 5.1	21.11 ± 3.2	484.0	0.205
Non-planning Impulsivity	21.61 ± 4.4	18.33 ± 5.7	532.500	0.041*
MOODS-SR subscales				
Psychomotor Activation (PA)	3.34 ± 2.4	2.21 ± 1.1	528.00	0.836
Mixed Instability (MIN)	1.85 ± 1.4	0.97 ± 0.6	507.00	0.049
Mixed Irritability (MIR)	1.16 ± 1.1	0.94 ± 0.8	443.500	0.170
Euphoria (EU)	2.09 ± 1.6	2.06 ± 1.7	0.042	0.959

*Significant after applying Bonferroni-Holm correction to the probability level.
Legend: PA= increased energy levels and activity, crowded or racing thoughts, shifting interests, talkativeness; MIN= sexual promiscuity, alcohol-related mood changes and irritability, frequently changing jobs, residences, friends, and hobbies; MIR= irritability associated with the use of medications and medical illnesses; EU= mood elevation, high sense of humor, feeling persistently good or high.

BED compared to those without. This result is consistent with previous observations showing that, in preoperative patients, food dyscontrol is associated with BED, eating disorders psychopathology, attentional impulsivity[34] and depressive symptoms[41,42]. In these studies, the role of impulsivity in relation to food is intuitive, but much less clear is its association with depression. Regarding this latter point, the heterogeneity of data reported in literature is detrimental for understanding the nature of depression in these patients. For example, in an interesting recent paper, Pearson et al.[35] posit that the depletion of self-control resources via "negative affect" can increase risk for binge eating. In Pearson's et al. study, negative affect was explored by the Positive and Negative Affect Schedule[43], which includes mainly mixed rather than purely depressive features (i.e., distressed, upset, hostile, irritable, nervous, jittery). Other studies reported subtantial depressive burden in patients candidate for bariatric surgery, but they did not explore the presence of soft bipolar signs, such as mood instability or emotional dysregulations. In our study, although lifetime rates of well-defined diagnoses of bipolar disorder are low and hypomania or mania are virtually absent in terms of prevalence ratio, instability of current mood states, rather than pure depression, emerged with differences between BED and non-BED patients. This picture actually reflects routine clinical practice, where the presence of a substantial rate of bipolar signs that are not detectable by using standard criteria for bipolar disorder is reported by clinicians. It is, therefore, reccomandable in these patients to apply a broader spectrum approach for evaluating the presence of mood disorders symptoms by using the MOODS-SR[25] or the Mood Disorder Questionnaire (MDQ)[44]. This assessment gives clinical significance not only to classical symptoms of full-blown mood episodes, but also to atypical symptoms, behavioral traits, and temperamental features typically associated with mood disorders, arguing that mood symptoms and traits may occur throughout life, sometimes in isolation rather than as part of a temporally circumscribed clinical syndrome. In an earlier study based on this unitary conceptualization of mood disorders, we demonstrated that many patients with recurrent major depression without discrete lifetime hypomanic episodes reported lifetime experience of hypomanic-manic symptoms and that the number of such symptoms was related to the number of lifetime depressive symptoms reported. As emerges from another Italian study, when subsyndromal hypomanic symptoms are specifically considered, with distinctive relevance of overactivity, rates of bipolar spectrum diagnoses in obese patients might turn out to be considerably high[45].

Among the study's limitations, an issue that has become strongly evident in this area is a bias bound to the patients' access modality to bariatric protocols. Many patients are sent to pre-surgical psychiatric evaluation after having already been routed to surgery by themselves or in other ways. Thus, the patient often experiences the psychiatric evaluation as a "test" to be passed to obtain a pre-defined "solution" rather than being accepted for their potential therapeutical implications. This may lead subjects to "soften" their description of symptoms and personality traits. In some cases, an adjunct psychological evaluation of coping styles, resources and resiliency could have mitigated this effect. Still, such intervention often exceeds the scope of the psychiatrist's in-

volvement as a liaison consultant. Additional limitations to be considered were the sample size, which prevented from carrying out more powerful statistical analyses, the lack of a control group and post-surgical data collection. In addition, the exclusion of patients with substance abuse may have led to a bias in the evaluation of the bipolar spectrum in these patients.

In conclusion, the relationship of BED, impulsivity and mood disorders is more complex than usually reported in literature. The presence of bipolar spectrum mood features should be systematically investigated in these patients due to their important clinical and therapeutical implications.

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