Journal of Affective Disorders 150 (2013) 981–986

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research report

Clinical phenotype of bipolar disorder with comorbid binge eating disorder

Susan L. McElroy [a,b,*,1], Scott Crow [c], Joanna M. Biernacka [d,e], Stacey Winham [d], Jennifer Geske [d], Alfredo B. Cuellar Barboza [e,f], Miguel L. Prieto [e,g], Mohit Chauhan [e], Lisa R. Seymour [e], Nicole Mori [a,b], Mark A. Frye [e]

[a] Lindner Center of HOPE, 4075 Old Western Road, Mason, OH 45040, USA
[b] Department of Psychiatry and Behavioral Neuroscience, University of Cincinnati College of Medicine, Cincinnati, OH, USA
[c] Department of Psychiatry, University of Minnesota Medical School, Minneapolis, MN, USA
[d] Divisions of Biomedical Statistics and Informatics, Department of Health Sciences Research, Mayo Clinic College of Medicine, Rochester, MN, USA
[e] Department of Psychiatry and Psychology, Mayo Clinic College of Medicine, Rochester, MN, USA
[f] Department of Psychiatry, Universidad Autonoma de Nuevo Leon, Monterrey, Mexico
[g] Department of Psychiatry, Universidad de los Andes, Santiago, Chile

ARTICLE INFO

Article history:
Received 10 April 2013
Accepted 10 May 2013
Available online 3 June 2013

Keywords:
Bipolar disorder
Binge eating disorder
Obesity

ABSTRACT

Background: To explore the relationship between binge eating disorder (BED) and obesity in patients with bipolar disorder (BP).
Methods: 717 patients participating in the Mayo Clinic Bipolar Biobank completed structured diagnostic interviews and questionnaires for demographic and illness-related variables. They also had weight and height measured to determine body mass index (BMI). The effects of BED and obesity (BMI≥30 kg/m^2), as well as their interaction, were assessed on one measure of general medical burden and six proxies of psychiatric illness burden.
Results: 9.5% of patients received a clinical diagnosis of BED and 42.8% were obese. BED was associated with a significantly elevated BMI. Both BED and obesity were associated with greater psychiatric and general illness burden, but illness burden profiles differed. After controlling for obesity, BED was associated with suicidality, psychosis, mood instability, anxiety disorder comorbidity, and substance abuse comorbidity. After controlling for BED status, obesity was associated with greater general medical comorbidity, but lower substance abuse comorbidity. There were no significant interaction effects between obesity and BED, or BMI and BED, on any illness burden outcome.
Limitations: There may have been insufficient power to detect interactions between BED and obesity.
Conclusions: Among patients with BP, BED and obesity are highly prevalent and correlated, but associated with different profiles of enhanced illness burden. As the association of BED with greater psychiatric illness burden remained significant even after accounting for the effect of obesity, BP with BED may represent a clinically important sub-phenotype.

1. Introduction

Bipolar disorder (BP) is associated with obesity (McElroy and Keck, 2012; Simon et al., 2006; Taylor et al., 2012) and binge eating disorder (BED) (Hudson et al., 2007; Javaras et al., 2008b; Kessler et al., 2013; McElroy et al., 2005, 2011). BED, the consumption of abnormally large amounts of food accompanied by a sense of lack of control but without inappropriate compensatory behaviors, is associated with obesity (Hudson et al., 2006, 2007; Kessler et al., 2013). All three conditions are associated with psychiatric and medical comorbidity, disability, and show patterns of familial aggregation (Cheung and Mao, 2012; Hudson et al., 2006, 2007; Javaras et al., 2008a; Kessler et al., 2013; Lilenfeld et al., 2008; Schulze et al., 2006). Both obesity and eating disorders are associated with greater psychiatric and general medical burden in BP patients (Bond et al., 2011; Calkin et al., 2009; Fagiolini et al., 2003, 2004; Goldstein et al., 2011; Kemp et al., 2013; McElroy et al., 2005, 2011; McElroy and Keck, 2012; Wildes et al., 2008; Yim et al., 2012). The relationship among obesity, BED, and illness burden among individuals with BP, however, has received little empirical attention. Thus, the association between BED and illness burden in BP could depend on body weight, and discriminating

* Corresponding author at: Lindner Center of HOPE, 4075 Old Western Road, Mason, OH 45040, USA. Tel.: +1 513 536 0700.
E-mail addresses: susan.mcelroy@lindnercenter.org, mcelrosl@uc.edu (S.L. McElroy).
[1] Supported by the Marriott Family.

0165-0327/$ - see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.jad.2013.05.024

if this association is dependent on BED alone, obesity alone, or an interaction of both is important. Moreover, variability in body mass index (BMI) has been shown to be associated with genetic variation (Yang et al., 2012). Potential clinically important sub-phenotypes of BP have been based on either specific symptomatology or comorbidity (Belmonte Mahon et al., 2011; MacQueen et al., 2005; Saunders et al., 2008). Under this hypothesis, BP with comorbid BED and/or obesity might be clinically important sub-phenotypes of BP.

In this study, we evaluated the relationship between BED status and obesity (defined as BMI≥30 kg/m^2) in 719 BP patients participating in a biobank. We assessed the effects of BED and obesity, as well as their interaction, on psychiatric and general medical illness burden, using proxy measures of illness severity based upon previously recognized clinically important BP sub-phenotypes (Belmonte Mahon et al., 2011; MacQueen et al., 2005; Saunders et al., 2008). We hypothesized that: BED would be associated with increased BMI; that both BED and obesity would be associated with elevated but different illness burden patterns; and that BP plus BED and BP plus obesity might each represent overlapping but distinct clinical sub-phenotypes. We also hypothesized that BED and obesity would enhance illness burden in BP patients in an additive or synergistic manner.

2. Methods

The Mayo Clinic Bipolar Biobank is a collaborative network of four sites (Mayo Clinic, Rochester, MN; Mayo Clinic Health System, Austin Medical Center, MN; Lindner Center of HOPE, Mason, OH; and University of Minnesota, Minneapolis, MN) formed to facilitate studies on disease risk and pharmacogenomics in BP. The protocol was approved by an Institutional Review Board at each site. Every participant had to provide written informed consent in order to be included in the study.

This ongoing project consists of a cross-sectional clinical/phenotypical assessment obtained from a convenience sample of consecutive BP patients drawn from academic mood clinics and inpatient units. Individuals were eligible for entry into the biobank if they had BPI or BPII disorder, or schizoaffective disorder, BP type, by DSM-IV criteria and confirmed by structured clinical interview. Exclusion criteria were inability to speak English, inability or unwillingness to provide written informed consent, and the presence of active suicidality or psychosis. This report involved patients who were enrolled in the biobank from July 2009 through December, 2012.

The clinical phenotype of participants was identified with the Structured Clinical Interview for DSM-IV (SCID) (First et al., 2005), the Bipolar Biobank Clinical Questionnaire (BiB-CQ), and the Bipolar Biobank Patient Questionnaire (BiB-PQ). Module D of the SCID was used to establish the diagnosis of BPI or II disorder, or schizoaffective disorder, bipolar type. A structured clinical questionnaire, the BiB-CQ, was administered by a member of the study team and used to determine historical illness variables (e.g., history of suicide attempts, psychotic symptoms, rapid cycling, and cycle acceleration over time), co-occurring psychiatric disorders (including BED), and treatment variables. Completed by the patient, the BiB-PQ assessed other clinical as well as demographic (e.g., age and gender) variables. General medical comorbidity was assessed with the Modified Cumulative Illness Rating Scale (CIRS) (Hudon et al., 2005), which measures patient-reported organ-specific comorbid medical illnesses and their severity.

Weight was obtained with the individual in light clothing but no shoes. Height was measured with a stadiometer. Body mass index (BMI), calculated by dividing weight (in kilograms) by height (in meters) squared, was used to estimate amount of body fat. Obesity was defined as BMI≥30 kg/m^2, and extreme obesity as BMI≥40 kg/m^2.

Psychiatric illness burden was evaluated with six different proxy measures of illness severity in BP: suicidality, psychosis, mood instability, anxiety disorder comorbidity, and substance abuse comorbidity. Suicidality and psychosis were dichotomous yes-no variables. Suicidality was positive if the patient endorsed ≥1 suicide attempt requiring medical intervention. Psychosis was positive if the patient had a lifetime history of hallucinations or delusions. The mood instability domain was determined by the sum of the lifetime presence of mixed episodes, rapid cycling, ultra rapid/ultradian cycling, cycle acceleration over time, and increased episode severity over time, each coded as no=0 and yes=1, and therefore ranged from 0 to 5. The anxiety disorder comorbidity domain (range 0–6) was the sum of the following lifetime comorbid anxiety disorders: post-traumatic stress disorder (PTSD), generalized anxiety disorder (GAD), social anxiety disorder (SAD), obsessive-compulsive disorder (OCD), phobia, and panic disorder. The substance abuse comorbidity domain was the sum of having lifetime alcohol abuse or dependence, drug abuse or dependence, or nicotine dependence, and ranged from 0 to 3. General medical burden was evaluated with CIRS score.

3. Statistical analysis

Patients included in this analysis had BP or schizoaffective disorder, bipolar type, BED status completed on BiB-CQ, and a recorded BMI. First, univariate analyses were used to compare demographic and clinical characteristics of BP patients with and without BED, and BP patients with and without obesity. For the univariate analyses, chi-square tests of association were used to compare distributions of gender, BP type, and each separate clinical feature or comorbid disorder between groups, while Wilcoxon rank sum tests were used to compare distributions of continuous variables.

Multivariate analyses were then performed to evaluate the joint effects of obesity and BED on general medical burden (CIRS scores) and the various psychiatric burden measures. Multivariate logistic regression models were used to study the effects of obesity, BED, and their interaction on psychiatric burden defined as history of a suicide attempt or psychosis. Ordinal logistic regression was used to examine obesity, BED, and their interaction as the predictors of substance abuse comorbidity (sum 0–3). Multivariate linear regression was used to study the effects of obesity, BED, and their interaction on sums of mood instability (sum 0–5), anxiety disorder comorbidity (sum 0–6), and general medical comorbidity (CIRS scores).

In addition, similar models were constructed using the quantitative BMI measure instead of obesity as a predictor. Finally, Poisson regression models of mood instability and anxiety disorder comorbidity sums were also examined and gave similar results to the linear regression analyses, but did not provide superior fit. Thus, the linear regression results are reported.

4. Results

Of 717 patients identified, 76.3% had BPI disorder, 9.5% had BED, 42.8% were obese, and 10.0% had extreme obesity (Table 1). 47 (6.6%) patients had BED and obesity. Univariate analyses demonstrated that BP patients with BED had a significantly higher BMI (by an average of 4.2 kg/m^2); significantly higher degrees of suicidality, psychosis, mood instability, and anxiety disorder comorbidity; significantly higher CIRS total scores; and were also more likely to be women, compared to those without BED (Table 1). BP patients with obesity were more likely to have BED (15.3% versus 5.1% of non-obese patients; $p < 0.0001$), had higher