Brief report

The prevalence of metabolic syndrome in patients with bipolar disorder

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Abstract

Background: Previous studies on the prevalence of metabolic syndrome (MetS) in patients with bipolar disorder have reported rates 11% and 79% higher than in their respective general populations. This study evaluates the prevalence of MetS in a group of 194 Spanish patients with bipolar disorder.

Methods: Naturalistic, multicentre, cross-sectional study. Patients were evaluated for presence of MetS according to modified NCEP ATP III criteria.

Results: Mean age was 46.6 (SD 13.9); 49.2% were male. Forty-six percent were in remission. Patients were receiving 2.9 (SD 1.3) drugs. Overall prevalence of MetS was 22.4%. Fifty-four percent met the criterion for abdominal obesity, 36.1% for hypertriglyceridemia, 38.2% for low HDL cholesterol, 20.9% for hypertension, and 12.2% for high fasting glucose. The multivariate analysis for MetS retained only the BMI variable in the model.

Limitations: Cross-sectional study design.

Conclusions: The prevalence of MetS in patients with bipolar disorder is 58% higher than that reported for the general Spanish population. MetS is associated with BMI. Clinicians should be aware of this issue and appropriately monitor patients with bipolar disorder for MetS as part of the standard of care for these patients.

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1. Introduction

Metabolic syndrome (MetS) is a cluster of metabolic abnormalities within a single subject that is considered an important risk factor for developing diabetes mellitus...
and cardiovascular disease (Haffner et al., 1992; Isomaa et al., 2001). Its incidence and prevalence have risen dramatically, especially in Western countries, as a result of the increasing prevalence of obesity (Case et al., 2002). As in schizophrenia, there is great concern about the prevalence of MetS in patients with bipolar disorder, although research in this area is scarce.

Fagiolini et al. (2005), following the criteria employed in the NHANES 1999–2000 study (Ford et al., 2004), found a 30% prevalence of MetS in US patients with bipolar disorder (mean age 46.9 years), slightly higher than that of US adults in general (26.7%). A study conducted in Turkey (Yumru et al., 2007), a Mediterranean-diet area, found an unadjusted 32% prevalence of MetS in a sample with a mean age of 34.5 years, using NCEP ATP III criteria. This prevalence is nearly twice the prevalence in the general adult population in Turkey, i.e., 17.9% (Sanisoglu et al., 2006). They also reported a statistically significant association between atypical antipsychotics and MetS, although they failed to find such an association between mood stabilisers and MetS.

This study evaluates the prevalence of MetS in 194 patients with bipolar disorder participating in the “General Health Status in Bipolar Disorders” study.

2. Methods

The “General Health Status in Bipolar Disorders” study is a naturalistic, cross-sectional study conducted at 13 centres in Spain. It was approved by the Internal Review Board of one of the centres and is in accordance with the 1975 Declaration of Helsinki. Informed consent was obtained from all subjects prior to enrolment.

2.1. Subjects

Participants included 194 patients with bipolar disorder ≥ 18 years of age seen consecutively between April and September 2006. Diagnoses were determined by experienced psychiatrists using ICD-10 criteria (WHO, 1992). All subjects were of Caucasian Spanish origin. Exclusion criteria were designed to be minimal, in keeping with the naturalistic design, and included refusal of informed consent.

2.2. Data collection and measures

Waist circumference was measured at the high point of the iliac crest and at the level of the umbilicus. Body mass index (BMI) was calculated as body weight (kg) divided by height squared (m²). Blood pressure consisted of a single, seated determination. Blood samples were collected if patients confirmed fasting for at least 8 hours.

MetS was defined according to NHANES 1999–2000 criteria:

1. Abdominal obesity: waist circumference ≥ 102 cm in men and ≥ 88 cm in women;
2. Hypertriglyceridemia: ≥ 150 mg/dL or on lipid-lowering medication;
3. Low HDL-C: < 40 mg/dL in men and < 50 mg/dL in women;
4. Hypertension: systolic pressure ≥ 130 mm Hg and diastolic pressure ≥ 85 mm Hg or on antihypertensive medication;
5. High fasting glucose: ≥ 110 mg/dL or on antidiabetic medication.

2.3. Statistical analysis

Association between MetS and its components and demographic and clinical variables was examined using chi-square and Student’s t tests, and a one-factor ANOVA for univariate analyses. A binary logistic regression (forward stepwise method) was performed using MetS as the dependent variable. Independent variables significantly associated with MetS and/or its components

| Criterion | Total n (%) | Men n (%) | Women n (%) | Statistics
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<tbody>
<tr>
<td>1. Waist circumference &gt; 102 cm (men) and &gt; 88 cm (women)</td>
<td>100 (53.8)</td>
<td>38 (41.8)</td>
<td>62 (65.3)</td>
<td>10.330 – 0.001</td>
</tr>
<tr>
<td>2. Triglycerides ≥ 150 mg/dL or being on lipid-lowering medication</td>
<td>66 (36.1)</td>
<td>32 (34.8)</td>
<td>34 (36.5)</td>
<td>0.278 – 0.598</td>
</tr>
<tr>
<td>3. HDL-C &lt; 40 mg/dL (men) and &lt; 50 mg/dL (women)</td>
<td>58 (38.2)</td>
<td>24 (30.8)</td>
<td>34 (45.9)</td>
<td>3.707 – 0.054</td>
</tr>
<tr>
<td>4. Blood pressure ≥ 130/85 mm Hg or being on antihypertensive medication</td>
<td>39 (20.9)</td>
<td>20 (21.5)</td>
<td>16 (17.2)</td>
<td>0.551 – 0.458</td>
</tr>
<tr>
<td>5. Fasting glucose ≥ 110 mg/dL or being on antidiabetic medication</td>
<td>23 (12.2)</td>
<td>7 (7.4)</td>
<td>14 (15.1)</td>
<td>2.714 – 0.099</td>
</tr>
<tr>
<td>At least three or more criteria</td>
<td>39 (22.4)</td>
<td>17 (19.3)</td>
<td>22 (25.9)</td>
<td>1.067 – 0.302</td>
</tr>
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HDL-C: High-density lipoprotein cholesterol.

* Chi-square test.
in the univariate analyses were included in the regression. The adopted two-tailed level of significance was .05.

3. Results

Mean age was 46.56 (SD 13.9) years; 50.8% were female. Most frequent ICD-10 bipolar subtypes were: in remission (46.5%), depressed mild/moderate (16.8%), hypomanic (11.5%), and manic with psychotic symptoms (11%). Mean Clinical Global Impression-Severity (CGI-S) subscale scores were: global 2.5 (SD 1.4), depression 1.9 (SD 1.2), and mania 1.8 (SD 1.3). Patients were receiving 2.9 (SD 1.3) drugs for bipolar disorder. Fifty-nine percent were receiving one, 30.1% two, and 1.6% three mood stabilisers. Lithium was used by 64.1%. Fifty-seven percent were receiving one, 8.3% two, and 0.5% three antipsychotics. Ninety percent of antipsychotics were atypical. Twenty-five percent of patients were receiving one, 3.1% two, and 0.5% three antidepressants. Mean BMI was 27.9 (SD 4.6) kg/m².

3.1. Metabolic syndrome

Overall prevalence of MetS in our sample was 22.4%. Fifty-four percent met the criterion for abdominal obesity, 36.1% for hypertriglyceridemia, 38.2% for low HDL-C, 20.9% for hypertension, and 12.2% for high fasting glucose. A greater proportion of women met the abdominal obesity and low HDL-C criteria (Table 1).

Those who had MetS were significantly older, had a significantly greater BMI, scored significantly lower in severity of mania, and were taking 2–3 mood stabilisers in a significantly greater proportion (Table 2). The unique variable significantly associated with MetS in the logistic regression model was BMI (adjusted OR = 1.319; 95% CI = 1.172 – 1.485).

4. Discussion

The prevalence of MetS in this study was almost 60% higher than that reported for the general Spanish population based on NCEP ATP III criteria (22.4% versus 14.2%, Perez-Jimenez et al., 2006). Unexpectedly, the increase in prevalence of MetS among patients with bipolar disorder was much greater than that found by Fagiolini (11%), despite the fact that both studies employed the same MetS criteria and mean ages were similar. The greatest increase in MetS prevalence was in Turkish patients with bipolar disorder (Yumru et al., 2006), 79% higher than in the general Turkish adult population (Sanisoglu et al., 2006). Furthermore, those patients were the youngest (34.5nnnyears) and the criteria used were the narrower NCEP ATPIII criteria. These results clearly indicate that a diagnosis of bipolar disorder implies a higher probability of having MetS and, therefore, clinicians should appropriately monitor these risk factors and intervene as required.

It is noteworthy that the prevalence of hypertriglyceridemia and hypertension was lower in Spanish patients with bipolar disorder (36.1% and 20.9% in our sample versus 48% and 39% in the Fagiolini sample), while the prevalence of abdominal obesity, low HDL-C, and high fasting glucose was higher (53.8% versus 49%, 38.2% versus 23%, and 12.2% versus 8%, respectively). These differences could be due to different eating habits and ethnicity, although specific studies should be done to clarify this.

Contrary to others (Fagiolini et al., 2005; Yumru et al., 2007), we found that prevalence of MetS increased...
significantly with age. Although gender was not associated with MetS, females showed a higher prevalence of abdominal obesity and low HDL-C. Unfortunately, the influence of gender on MetS and/or its components has been neglected in patients with bipolar disorder. Only Yumru et al. have analysed the influence of gender on MetS (but not its components), failing to find a statistically significant association.

Concerning relationships between medications and MetS, we found that the greater the number of mood stabilisers taken, the higher the likelihood of meeting criteria for MetS, although this association was not confirmed by the multivariate analysis. Recent studies on lithium have failed to demonstrate such an association (Yumru et al., 2007; Livingstone and Rampes, 2006), while second-generation antipsychotics have been associated with high prevalence of MetS (Yumru et al., 2007; Melkersson and Dahl, 2004; Mackin et al., 2005; Correll et al., 2006).

Considering the potential impact of MetS and its components on mortality and morbidity rates (2.01 odds ratio for cardiovascular disease and 1.3 odds ratio for diabetes (Ninomiya et al., 2004)), there is a need for psychoeducational programmes including healthier eating habits and lifestyle advice for patients with bipolar disorder. Furthermore, effective programmes aimed at early detection and adequate treatment by the psychiatric team should be considered. Implementation of programmes that emphasise lifestyle modification to reduce weight in overweight/obese patients can positively influence many components of MetS (Wilson and Grundy, 2003a,b).

This study had some limitations. Firstly, the cross-sectional design reflects only a specific moment in time. However, this study provides a good idea of the scope of MetS and its components that clinicians need to monitor when treating these patients. However, while this sample may not be representative of Spanish patients with bipolar disorder, the number of patients enrolled was sufficient to merit taking these results into consideration. The fact that our sample was ethnically homogeneous is another limitation. In addition, there was no way to know if blood tests were really taken in a fasting state and adherence was not assessed. Finally, the study was designed to investigate the prevalence of MetS in patients with bipolar disorder and not the differential impact of psychopharmacological treatments on the physical health of these patients.

In conclusion, our results confirm the high prevalence of MetS in patients with bipolar disorder, 60% higher than that reported for the general Spanish population. MetS is associated with body mass index. Clinicians should be aware of these issues and appropriately monitor patients with bipolar disorder for components of MetS as part of the standard of care when treating these patients.

Role of funding source
This study has been conducted without sponsor.

Conflict of interest
A. Benabarre has been a consultant for Pfizer Inc.
J. Bobes has been a consultant for Astra-Zeneca, Bristol-Myers Squibb, Johnson & Johnson, Ely Lilly and Pfizer Inc.
All other authors declare that they have no conflicts of interest.

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