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A preliminary morphometric magnetic resonance imaging study of regional brain volumes in body dysmorphic disorder

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Abstract

Morphometric magnetic resonance imaging (MRI) was used to compare regional brain volumes in eight women with body dysmorphic disorder (BDD) and eight healthy comparison subjects. The BDD group exhibited a relative leftward shift in caudate asymmetry and greater total white matter vs. the comparison group. Findings with respect to the caudate nucleus are consistent with both the conceptualization of BDD as an obsessive–compulsive spectrum disorder, and the ‘striatal topography model’ of obsessive–compulsive disorders.

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1. Introduction

The neurobiological basis of body dysmorphic disorder (BDD) remains poorly understood. Though BDD has continued to be classified as a somatoform disorder (American Psychiatric Association 1994), alternative schemes have suggested that BDD might be better conceptualized as one of a group of so-called ‘Obsessive–Compulsive Spectrum Disorders’ (OCSs) along with obsessive–compulsive disorder (OCD), Tourette syndrome (TS) and trichotillomania (TTM) (e.g. Hollander et al., 1993). Some researchers have also proposed that BDD might be conceptualized as one of a group of so-called ‘Affective Spectrum

disorders’ (ASDs) (e.g. Phillips et al., 1994). The current study was designed to investigate regional brain volumes in a group of women with BDD and compare them to a group of healthy comparison subjects. We hypothesized that BDD would be associated with increased total white matter volume and decreased caudate volume, consistent with the conceptualization of BDD as an obsessive–compulsive spectrum disorder.

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Disorders', along with major depressive disorder (Phillips et al., 1995b).

In the current study, we employed morphometric magnetic resonance imaging (MRI) methods to test specific hypotheses regarding differences in regional brain volumes between subjects with BDD and a psychiatrically healthy comparison group. Our a priori hypotheses were selected to investigate the theory that BDD is an OCSD or an affective spectrum disorder; the specific hypotheses were guided by the existing literature pertaining to OCSDs and affective disorders. Morphometric MRI studies of OCSDs have most consistently found volumetric abnormalities of the striatum (see Rauch and Baxter, 1998). The 'striatal topography model' of OCSDs (see Baxter et al., 1990; Rauch et al., 1998) suggests that these disorders share striatal pathology as a common attribute, and that the distribution of pathology among striatal territories governs the presenting clinical phenomena; specifically, OCSDs primarily characterized by cognitive or visuospatial symptoms, such as OCD or BDD, are associated with caudate abnormalities, whereas OCSDs primarily characterized by sensorimotor symptoms, such as TS and TTM, are associated with putamen abnormalities. In fact, by MRI, striatal findings in OCD have principally implicated the caudate nucleus (e.g. see Robinson et al., 1995), whereas studies of TS (e.g. Peterson et al., 1993; Singer et al., 1993) and TTM (O'Sullivan et al., 1997) have shown analogous abnormalities involving the putamen or lenticulate. Furthermore, though in some instances the observed abnormalities entail reduced striatal volumes, in several instances the reported findings suggest abnormalities in striatal asymmetry across hemispheres (i.e. laterality quotient) (see Jenike et al., 1996; Singer et al., 1993; Peterson et al., 1993). In addition, two MRI studies of OCD have found diffuse reductions in white matter volume (Breiter et al., 1994; Jenike et al., 1996). Thus, taken together, prior imaging research prompted the hypotheses that if BDD is to be conceptualized as an OCSD, subjects should exhibit abnormal striatal and white matter volumes; more specifically, volumetric abnormality of the caudate nucleus manifested as either reduced vol-

ume or a shift in asymmetry, as well as reduced white matter volume.

In contrast, though MRI studies of affective disorders have also occasionally found basal ganglia abnormalities (see Dougherty and Rauch, 1997), recent structural findings in primary major depression have principally implicated the hippocampus (e.g. see Bremner et al., 2000; Sheline, 2000; Sheline et al., 1996, 1999) rather than the striatum (e.g. see Pillay et al., 1998; Lenze and Sheline, 1999). Furthermore, reduced hippocampal volumes in major depression are consistent with emerging theories of pathophysiology as well as potential mechanisms of antidepressant action (see Duman et al., 1997; Sapolsky, 2001). Thus, taken together, prior imaging research prompted the hypothesis that if BDD is to be conceptualized as an affective spectrum disorder, subjects would exhibit reduced hippocampal volumes.

2. Methods

2.1. Subjects

Written informed consent was obtained from each subject in accordance with the Institutional Review Boards of Massachusetts General Hospital (MGH) and Butler Hospital. The study sample comprised eight women with BDD, recruited from the MGH OCD Unit or the Butler Hospital BDD Program. DSM-IV BDD was diagnosed with a reliable SCID-like measure (Phillips et al., 1995a), and BDD severity was assessed using a reliable and valid version of the Yale-Brown Obsessive-Compulsive Scale modified for BDD (BDD-YBOCS; see Goodman et al., 1989; Phillips et al., 1997). The sample evidenced moderately severe BDD [mean (\pm S.D.) BDD-YBOCS scores = 29.9 (\pm 2.8)]. With respect to comorbidity in the BDD group, as assessed by the Structured Clinical Interview for DSM-III-R and clinical interviews (American Psychiatric Association, 1994; Spitzer et al., 1992; Williams et al., 1992), three subjects met criteria for current social phobia, one of whom also had current major depressive disorder. Additional comorbid lifetime Axis I psychiatric diagnoses were bulimia ($N=2$), major depressive

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