

Self-destructiveness and serotonin function in bulimia nervosa

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Abstract

Studies have linked bulimia nervosa (BN) to alterations in brain serotonin (5-hydroxytryptamine: 5-HT) activity and to heightened propensity for parasuicidality and self-injuriousness. The coincidence of self-destructiveness and 5-HT abnormality in BN is of interest, given documentation (in various populations) of an inverse association between 5-HT activity and potential for self-harm. The present study examined the connection between 5-HT status and self-destructiveness in BN. Structured interviews and self-report questionnaires were used to assess 40 bulimic and 21 normal-eater women for: (a) history of parasuicidal or self-injurious acts; and (b) mood and impulse-regulation problems. We then applied tests, presumed to reflect 5-HT function, of serial prolactin (PRL) and cortisol (CORT) responses after oral administration of the partial 5-HT agonist, meta-chlorophenylpiperazine (m-CPP). Relative to non-bulimic women, bulimic women (on average) showed blunting of PRL and CORT following m-CPP. The blunting of neuroendocrine responses was, however, most remarkable in bulimic women with a history of self-destructiveness. These findings suggest that some serotonergic anomalies reported in BN sufferers (i.e. reduced neuroendocrine response after m-CPP) may be most characteristic of individuals in the population showing clear-cut self-destructive potential. © 2001 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Suicide; Self-mutilation; m-CPP; Eating disorders; Cortisol; Prolactin

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1. Introduction

Evidence suggests that bulimia nervosa (BN) coincides with alterations in central serotonin (5-hydroxytryptamine: 5-HT) activity (Brewerton, 1995; Wolfe et al., 1997). Studies in bulimic patients have documented decreased 5-HT metabolites in cerebrospinal fluid (CSF: Jimerson et al., 1992), reduced platelet binding of the 5-HT uptake inhibitors [³H]imipramine (Marazziti et al., 1988) and [³H]paroxetine (Steiger et al., 2000) and blunted prolactin (PRL) responses to 5-HT agonists or partial agonists (Brewerton et al., 1992; Levitan et al., 1997). Data from independent studies show bulimic patients to display prominent parasuicidality or self-mutilation behaviours (Mitchell et al., 1986) and some findings (most based on very small samples) suggest that impulsive symptoms in BN may correspond to greater abnormality on various indices of 5-HT functioning (Steiger et al., 2001; Verkes et al., 1996; Waller et al., 1996).

Coincidence of self-destructiveness and 5-HT abnormality in BN is intriguing, given documentation in other psychiatric populations of a systematic (inverse) association between 5-HT activity and self-destructive (i.e. parasuicidal or self-injurious) potentials. For example, research in depressed and personality-disordered patients has linked suicidal, self-injurious and/or impulsive-aggressive behaviors to: (a) low CSF 5-hydroxyindoleacetic acid (5-HIAA: Åsberg et al., 1987; Lopez-Ibor et al., 1985); (b) decreased 5-HT and imipramine binding in post-mortem brain tissue (Stanley et al., 1982); (c) reduced PRL responses following the 5-HT agonist D,L-fenfluramine (Coccaro et al., 1989; New et al., 1997); and (d) blunted metabolic responses, measured by positron emission tomography, following administration of the 5-HT agonist D,L-fenfluramine (Siever et al., 1999; Soloff et al., 2000). Such findings motivated us to explore the association between serotonin status and self-harming behaviors in BN.

In the present study, we assessed 5-HT function by measuring PRL and cortisol (CORT) responses following oral administration of the partial 5-HT agonist, meta-chlorophenylpiperazine

(m-CPP). The rationale for this procedure rests upon the assumption that stimulation with 5-HT agents results in increased release of PRL (via serotonergic pathways into the pituitary) and CORT (via indirect hypothalamic–pituitary–adrenal axis connections). As it binds with highest affinity to 5-HT_{2c} receptors and lesser affinity to 5-HT_{1a} and alpha₂-noradrenergic receptors, m-CPP is thought to constitute a fairly specific probe of postsynaptic 5-HT function (Yatham and Steiner, 1993). The PRL and CORT response following m-CPP administration has been used to study 5-HT neurotransmission in several previous studies on BN (Brewerton et al., 1992; Levitan et al., 1997; Steiger et al., 2001).

2. Methods

2.1. Participants

This study received institutional ethics-board approval, and involved participation by written informed consent. Forty bulimic women were recruited through outpatient services at a specialized eating disorders program. Eating-disorder (ED) status was confirmed at the start of the study using the Eating Disorders Examination (EDE) interview (Fairburn and Cooper, 1993) (described below). According to the EDE, 31 (77.5%) of these women met Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition (DSM-IV: American Psychiatric Association, 1994) criteria for BN purging subtype, 6 (15.0%) for BN non-purging subtype, and 3 (7.5%) for ‘subclinical’ BN purging type (i.e. bingeing once vs. the requisite twice weekly). Mean age and body mass index (BMI: kg/m²) in this sample were 23.88 (±4.07) and 21.79 (±2.87), respectively. Twenty-five normal-eater women were recruited through university classes or advertisements (so as to approximate the student vs. non-student ratio in our bulimic sample); they denied psychoactive-medication use, and showed no past or present ED according to EDE exams. After administration of the computerized version of the Diagnostic Interview Schedule for DSM-IV (DIS-4: Lepage et al., 1996) and the Structured Clinical

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