



Regional cerebral blood flow after recovery from bulimia nervosa

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Abstract

When ill, women with bulimia nervosa (BN) show alterations of regional cerebral blood flow (rCBF). In this study we investigated rCBF in nine women in long-term recovery from BN (RBN, $n = 9$), i.e. more than 1 year without bingeing/purging behavior, normal weight, stable food intake, and regular menses, and compared them with age-matched healthy control women (CW, $n = 13$). Positron emission tomography (PET) was used for the assessment of rCBF. There were no significant differences in rCBF between groups. However, rCBF was significantly inversely related to length of recovery in RBN for the left and right prefrontal cortex (BA 10), right medial orbital frontal cortex (BA 11), left subgenual cingulate (BA 25), right anterior cingulate (BA 32), left sensory motor cortex (BA 1,2,3,4), left and right lateral temporal (BA 21), and left occipital cortex (BA 17), as well as left thalamus. This finding suggests that previously reported alterations in rCBF during the ill state of BN may be a state-related phenomenon that remits with recovery. It is also possible that reductions in rCBF occur in a later stage of recovery from BN. © 2000 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Bulimia nervosa; Recovery; Cerebral blood flow; Positron emission tomography

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1. Introduction

Bulimia nervosa (BN) is a psychiatric disorder characterized by regular bingeing and purging behavior that typically has its onset during adolescence (American Psychiatric Association, 1994). Psychosocial factors have been implicated in the development of this disorder (Stice, 1999; Troop and Treasure, 1997). However, family and genetic studies suggest a hereditary transmission of BN (Kendler et al., 1991; Lilenfeld and Kaye, 1998). In addition, disturbances of the serotonin system after long-term recovery suggest a biologic trait-related disturbance in BN (Kaye et al., 1998; Smith et al., 1999).

Functional brain imaging provides us with the opportunity to investigate brain mechanisms in vivo, and helps localize regional disturbances associated with psychiatric disorders (Weight and Bigler, 1998). Several brain-imaging studies have investigated cerebral blood flow and metabolism in BN. Nozoe et al. (1995) found that regional cerebral blood flow (rCBF) in acutely ill BN was elevated in inferior frontal and left temporal cortical areas, and changed in relation to a test meal. It was suggested that frontal and/or temporal cortical areas might be involved in the pathophysiology of BN. Most recently, it was proposed that CBF in BN may vary in relation to restricting or binge-eating phases (Hirano et al., 1999). Regional relative glucose metabolism was found to be lower in the parietal cortex in ill BN compared to controls in one study (Delvenne et al., 1997), whereas another group did not find such alterations (Andreason et al., 1992). Glucose metabolism, however, correlates with blood flow in healthy subjects (Fox et al., 1988). Thus, such alterations could be associated with alterations in rCBF.

The etiology of BN is not known. In addition to pathologic eating behavior, BN is characterized by disturbed emotional states such as increased anxiety and depressive feelings in the ill and recovered states (Kaye et al., 1998). Emotional states are thought to be related to brain regions such as the amygdala, orbital frontal and cingulate cortex, and the thalamus (Drevets and Raichle, 1992; Charney and Deutch, 1996), and

altered mood states might be associated with disturbances of cerebral activity, i.e. blood flow, in these regions (Reiman, 1997; Krishnan, 1999). Thus, pathologic behaviors in BN could be reflected by localized alterations of brain cortical activity.

However, studies of ill BN women are potentially confounded by the many physiologic disturbances associated with bingeing and purging. A strategy to avoid confounding factors of the ill state is to study women after recovery from BN. If alterations persist after recovery, it is possible that such alterations may be traits that might contribute to the onset of the disorder. Alternatively, persistent alterations could be the consequence of abnormal eating behavior. In this study we investigated rCBF in women in long-term recovery from BN (RBN) compared to healthy control women (CW), in order to investigate if rCBF alterations persist after recovery.

2. Methods

2.1. Subjects

Nine women who had previously met DSM-III-R criteria for BN were recruited. No subject had a history of anorexia nervosa (AN), and they must have maintained a body weight of greater than 85% of average body weight (%ABW, Metropolitan Life Insurance Company, 1959) since development of an eating disorder. Subjects were previously treated in the eating disorders treatment program at the Western Psychiatric Institute and Clinic, University of Pittsburgh, PA, USA or were recruited through advertisements. To be considered 'recovered', subjects had to — for at least 1 year before the study — (1) maintain a weight above 90% ABW, (2) have regular menstrual cycles, and (3) have not binged, purged, or engaged in restrictive eating patterns. Additional exclusion criteria were the use of psychoactive medication such as antidepressants and alcohol or drug abuse or dependence within 3 months of the study. Thirteen healthy CW were recruited through local advertisements. The CW had no history of an eating disorder or any psychiatric,

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