

Hyperventilation challenge test in panic disorder and depression with panic attacks

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Abstract

Our aim was to determine whether panic disorder (PD) patients, major depressive patients without panic attacks (MD) and major depressive patients with panic attacks (MDP) respond similarly to hyperventilation challenge tests. We randomly selected 35 PD patients, 33 MDP patients, 27 MD patients and 30 normal volunteers with no family history of anxiety or mood disorder. The patients had not been treated with psychotropic drugs for at least 1 week. They were induced to hyperventilate (30 breaths/min) for 4 min, and anxiety was assessed before and after the test. A total of 16 (45.7%) PD patients, 12 (36.4%) MDP patients, four (11.1%) MD patients, and two (6.7%) normal volunteers had a panic attack after hyperventilating. The PD and MDP patients were significantly more responsive to hyperventilation than the MD patients and the normal volunteers. The MD patients had a significantly lower heart-rate response to the test than all the other groups. There is growing evidence that PD patients are more sensitive to the vasoconstrictive effects on basilar arterial blood flow caused by hyperventilation-induced hypocapnia than are comparison subjects. Our data suggest that there is an association between panic attacks and hyperreactivity to an acute hyperventilation challenge test. © 2001 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Panic attacks; Major depression; Heart rate; Anxiety disorder; Comorbidity; Ventilation

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1. Introduction

Hyperventilation is an increase in the amount of inhaled and exhaled air per minute that exceeds the amount necessary for normal cell metabolism (Papp et al., 1997). Stress-induced hyperventilation produces symptoms that people are prone to misinterpret as life-threatening if they are unaware of the consequences of overbreathing (Papp et al., 1997). Misinterpretation of these symptoms increases fear and activates the autonomic nervous system, resulting in an increased respiratory frequency that further dissipates carbon dioxide and intensifies hypocapnic symptoms (Gorman et al., 1994).

Hyperventilating at 30 breaths per min, although causing a significant drop in end-tidal CO_2 to conventionally accepted levels of hypocapnia, seems to be a less convincing panicogenic challenge than CO_2 inhalation (Rapee et al., 1992). In a small group of panic disorder patients, however, hyperventilation may be a safe and easy test of the propensity to experience panic attacks. Moreover, hyperventilation has been considered to be a cause, a correlate and a consequence of panic attacks (Papp et al., 1998; Nardi et al., 2000a).

Respiratory abnormalities are associated with anxiety, particularly with panic attacks (Gorman et al., 1994; Papp et al., 1997). Symptoms such as shortness of breath, an 'light-headed' feeling, dizziness, paresthesias and tachypnea have been described in patients with panic disorder (Rapee et al., 1992; Gorman et al., 1994).

Multiple lines of evidence link biologic, especially respiratory, findings to anxiety disorders (Holt and Andrews, 1989; Rapee et al., 1992) and mood disorders (Kent et al., 2001). Strategies that involve the use of respiratory challenge tests have been especially fruitful in generating hypotheses about panic disorder (Papp et al., 1993; Battaglia and Perna, 1995) and about groups without panic disorder but with a high susceptibility to respiration-induced panic attacks (Kent et al., 2001).

Our aim in the present study was to observe whether panic disorder patients and major depressive patients with panic attacks responded in similar ways to the induction of panic attacks by a

hyperventilation challenge test using room air hyperventilation (30 breaths/min) over a 4-min period. We also compared panic disorder patients and major depressive patients with panic attacks to major depressive patients without panic attacks. We expected that the two clinical groups with panic attacks would show a greater sensitivity to the hyperventilation challenge test than either depressed patients without panic attacks or normal volunteers.

2. Methods

2.1. Subjects

We randomly selected 35 panic disorder patients (PD group: 20 women and 15 men; mean age \pm S.D. = 35.9 ± 10.7 years); 33 major depressive patients with panic attacks (MDP group: 22 women and 11 men; mean age \pm S.D. = 44.1 ± 13.2 years) and 27 major depressive patients without panic attacks (MD group: 18 women and 9 men; mean age \pm S.D. = 41.8 ± 14.0 years) from the Laboratory of Panic and Respiration and the General Outpatient Clinic of the Institute of Psychiatry, Federal University of Rio de Janeiro. None of the participants were recruited for any other study. In addition, a group of 30 normal subjects with no family history of anxiety or mood disorder (16 women and 14 men, mean age \pm S.D. = 31.6 ± 9.4 years) was used for comparison.

2.2. Diagnosis and procedures

After subjects received a clinical diagnosis of PD, MD or MDP made by a study psychiatrist, a second clinician interviewed them with the Structured Clinical Interview for Diagnosis (SCID; First et al., 1997) for DSM-IV (American Psychiatric Association, 1994). If the two clinicians disagreed on the diagnosis, they met to confer. If a consensus on the diagnosis could not be reached, the subject was not enrolled in the study. Patients in the MDP group were currently depressed and panic attacks had developed after the beginning of the depression, they did not have panic attacks when not depressed, and they did not have the

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