A New Approach: Using Virtual Reality Psychotherapy in Panic Disorder With Agoraphobia

by Brenda K. Wiederhold, Ph.D., M.B.A., BCIA, and Mark D. Wiederhold, M.D., Ph.D.

Psychiatric Times ● July 2003 ● Vol. XX ● Issue 7

As listed in the *DSM-IV-TR*, the essential features of panic disorder are "the presence of recurrent, unexpected Panic Attacks, followed by at least 1 month of persistent concern ... or a significant behavioral change related to the attacks" (American Psychiatric Association, 2000). Panic disorder is characterized by instances of an intense sense of impending doom in which many patients will feel dizzy, hyperventilate and sweat. They can also experience chest pain, nausea and a fear of losing control. Because panic disorder can be accompanied by a high incidence of physical symptoms, it may be misdiagnosed or overlooked in assessments of a general medical condition by physicians or in emergency room care (APA, 2000; Hales et al., 1997). Panic disorder is chronic and may interrupt an individual's normal functioning. Each year, panic disorder will afflict more individuals than AIDS, stroke or epilepsy. Patients with panic disorder have a 20% incidence of suicide attempts, particularly when other psychiatric disorders are present.

Agoraphobia is a condition that can be diagnosed either with or without panic. According to the *DSM-IV-TR*, the patient fears being in places where escape would be difficult or embarrassing or where help might not be available. The situations are avoided or endured with marked distress or anxiety about having a panic attack or panic-like
symptoms. For those suffering from panic disorder, agoraphobic avoidance may first occur in situations associated with the first panic attack (Faravelli et al., 1992).

Treatment of both panic disorder and panic disorder with agoraphobia will usually involve medication, cognitive-behavioral therapy (CBT) or a combination of the two. Medications used include selective serotonin reuptake inhibitors, tricyclic antidepressants, benzodiazepines and monoamine oxidase inhibitors (Saeed and Bruce, 1998). Cognitive-behavioral therapies may include relaxation, breathing retraining with or without the use of physiological monitoring, exposure therapy, and cognitive restructuring. It is generally understood that CBT is the most effective psychotherapeutic treatment modality for panic disorder and panic disorder with agoraphobia, and it can be used effectively in combination with pharmacologic therapy (Saeed and Bruce, 1998).

A large number of people who suffer panic attacks describe hyperventilation as one of their symptoms (Holt and Andrews, 1989). This observation lends support to the idea that hyperventilation may play a causal role in panic attacks. Panic attacks are seen as the product of stress-induced respiratory changes that then provoke fear of a heart attack or losing control of the ability to regulate bodily processes. Many researchers have found breathing retraining to be helpful (Ley, 1991). Clark et al. (1985) showed a marked reduction in panic attacks in patients who received two weekly sessions of breathing retraining and cognitive-restructuring training.

Interoceptive exposure involves having the patient perform such activities as purposefully overbreathing (hyperventilating) to experience the same symptoms they feel when experiencing a panic attack. This allows the patient to realize the control they have over their symptoms and to understand that the symptoms are not life-threatening. These exercises take place after the patient and therapist have established a trusting alliance and after cognitive restructuring, breathing retraining and relaxation techniques have been taught. This allows the patient to feel safe during the exposure and brings greater awareness of the cognitions attached to their physical responses of panic.

New technologies may prove invaluable to patients, especially those who do not respond to traditional exposure therapies. One study used a computer-aided system that administered anxiety questionnaires, self-exposure techniques and anxiety-management techniques to 15 patients with agoraphobia (Shaw et al., 1999). Most patients showed moderate-to-marked improvement, although they reported that they
would have preferred some contact with a clinician.

Another study used a non-immersive, two-dimensional computer simulation to assess 18 patients with agoraphobia (Kirkby et al., 1999). Participants guided a computer figure into an elevator. Results showed improvement of agoraphobic symptomatology and a reduction in questionnaire scores following treatment. The data showed that participants guided the computer figure into the elevator more as exposure continued, an increase from 43% to 62% over the course of three treatment sessions. Questionnaire scores decreased over treatment, showing a lessening of anxiety.

In an effort to treat individuals who have not responded to non-immersive treatment, several groups have begun to experiment with immersive virtual reality graded exposure therapy (VRGET), with audio and visual images delivered through a head-mounted display. To establish a baseline with which to compare phobic individuals' responses in a virtual reality (VR) world, a study at the Virtual Reality Medical Center exposed non-phobic participants to four different VR environments developed for the treatment of panic and agoraphobia. Peripheral skin temperature, heart rate, heart rate variability, respiration and skin conductance were measured during exposure.

The results indicated that non-phobic individuals become sympathetically aroused when exposed to non-threatening virtual environments. Their physiology, however, does not show as much arousal and stabilizes much more quickly than the physiology of those with panic and agoraphobia. From these results, one can speculate what levels of arousal it might be realistic to expect from patients when entering the virtual world (Moore et al., 2002).

Studies involving phobic subjects have also been completed. Since one of the criteria for agoraphobia is anxiety about being in places or situations where escape might be difficult or embarrassing, and since fears usually involve a cluster of situations rather than just one, a study by North et al. (1996, 1995) used several virtual scenarios that included bridges, dark rooms, hot air balloons and balconies. At the end of treatment, 24 of 30 participants (80%) experienced a decrease in discomfort levels.

Seven participants with panic disorder with agoraphobia were treated as part of a driving-simulation study including several tunnel scenes, some in which traffic jams occurred (Jang et al., 2000). Prior to the beginning of treatment, participants were given self-report measures covering anxiety, attitudes toward agoraphobia, body sensation, simulator sickness and fear. Both physiological measures and
Subjective Unit of Disturbance Scale (SUDS) ratings were assessed during VRGET, and the psychiatrist had the participant do relaxation techniques if anxiety became too intense. Subjects reported an inability to become immersed in the environment, and the protocol was discontinued after two exposure sessions. Extraneous light sources, uncomfortable head-mounted displays, the location of the therapist in relation to the patient and uncomfortable physiological sensors placed on the participants rendered the subjects' VR experience unsuccessful (Jang et al., 2000). Although the intended results of this study were not obtained, it provided highly useful information on how crucial it is to block extraneous light during VR sessions, find the best location of therapist in reference to patient and orient patients to equipment.

The protocol used by Jang et al. (2000) has been modified to account for these shortcomings and is currently being used at the Virtual Reality Medical Center with a 90% degree of success. This highlights therapist skill in applying these tools in treatment, as well as the importance of incorporating patient feedback in protocol refinement.

An additional treatment protocol for panic disorder and agoraphobia, experiential-cognitive therapy, has been developed at the Applied Technology for Neuro-Psychology Lab of Istituto Auxologico Italiano, in Verbania, Italy, in collaboration with the Catholic University of Milan (Vincelli et al., 2000). The goal is to modify dysfunctional cognitions and to desensitize patients to the fear and anxiety associated with certain situations. In initial pilot studies combining VRGET and traditional CBT techniques, it has been shown that successful treatment is possible in seven treatment sessions with post-treatment booster sessions. The Virtual Environments for Panic Disorders system was created for the experiential-cognitive therapy protocol (Vincelli et al., 2000). This is a four-zone, virtual environment in which therapists can manipulate key characteristics.

In initial sessions using the Virtual Environments for Panic Disorders system at the Virtual Reality Medical Center with over 40 patients who have panic disorder with agoraphobia, both the driving scenarios and the four-zone scenario are used as an adjunct to traditional CBT. The patient is taught to control physiology with the use of visual feedback, first in a relaxed setting and then in the virtual-exposure scenarios. Patients are able to become immersed in the virtual worlds and experience both subjective (self-report) and objective (physiological) anxiety. Because they have first been taught anxiety-management techniques, they are willing to stay with this anxiety while utilizing cognitive and breathing techniques to lessen the anxiety. Because the virtual environment provides a safe place for this
practice to occur, the patient appears more willing to initiate exposure and participate in treatment. By experiencing successes, the patient's self-efficacy and sense of control increase, and this translates into the patient's willingness to test these skills in a real-world situation.

The advantages of VRGET compared to in vivo exposure include:

- There is no loss of patient confidentiality since the treatment sessions can be performed in the therapist's office;
- There are no safety issues because the VRGET can be terminated and the VR system turned off any time the patient requests;
- There is more flexibility in the session. If a patient is only frightened of one aspect of exposure, then this can be practiced over and over in the virtual world. In the real world, a patient may feel conspicuous repeatedly completing the same behavior;
- The experience is just unreal enough that many patients who have resisted therapy due to in vivo approaches are willing to try treatment; and
- There is less time involved. Because the treatment can be conducted more easily within the "therapeutic hour," it will be more cost effective (Wiederhold and Wiederhold, 2000).

Current treatments focus on pharmacologic treatments and cognitive and behavioral interventions. The VRGET system offers a new approach to non-pharmacologic intervention that might reach patients unwilling or unable to utilize in vivo techniques. Initial results from clinical use of virtual environments for the treatment of panic disorder are promising.

Dr. Brenda K. Wiederhold is executive director of the Virtual Reality Medical Center and a professor in the department of psychiatry at the University of California, San Diego.

Dr. Mark D. Wiederhold is president of the Virtual Reality Medical Center and editor-in-chief of CyberPsychology & Behavior.

References


Wiederhold BK, Wiederhold MD (2000), Lessons learned from 600 virtual reality sessions. Cyberpsychol Behav 3(3):393-400.