Expert Opinion

Panic Attacks Induced by Olfactory Stimuli: An Emerging Paradigm for Idiopathic Environmental Intolerance (Multiple Chemical Sensitivity)

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Abstract: Idiopathic environmental intolerance (IEI), or multiple chemical sensitivity (MCS), is a clinical description for a cluster of symptoms that some have attributed to exposure to otherwise nonnoxious environmental stimuli. However, reliable scientific data to support these claims are lacking. Instead, there is a growing body of evidence supporting the concept that, in many cases, IEI is the result of panic attacks precipitated by psychologically conditioned olfactory stimuli, yet many physicians are unfamiliar with this concept. This article summarizes the evidence that panic disorder is responsible for much of the symptomatology attributed to IEI and highlights important therapeutic implications, particularly for mental health care providers.

Résumé : Crises de panique causées par des stimuli olfactifs : naissance d’un paradigme pour l’intolérance idiopathique à l’environnement ou la sensibilité aux agresseurs chimiques

L’intolérance idiopathique à l’environnement (IIE) ou la sensibilité aux agresseurs chimiques (SAC) est une description clinique d’un ensemble de symptômes que certains ont attribués à l’exposition à des stimuli environnementaux par ailleurs non nocifs. Toutefois, des données scientifiques fiables font défaut pour appuyer ces hypothèses. Des preuves de plus en plus nombreuses appuient plutôt la notion selon laquelle, dans bien des cas, l’IIE est le résultat de crises de panique provoquées par des stimuli olfactifs conditionnés psychologiquement, et pourtant, nombre de médecins ne connaissent pas ce concept. Cet article résume les données prouvant que le trouble panique est responsable en grande partie de la symptomatologie attribuée à l’IIE, et il présente les principales implications thérapeutiques, en particulier pour les fournisseurs de soins de santé mentale.

Key Words: idiopathic environmental intolerance, multiple chemical sensitivity, panic

Idiopathic environmental intolerance is not an allergic or toxic condition

Patients who claim to have idiopathic environmental intolerance (IEI) attribute various symptoms, including lightheadedness, dizziness, breathlessness, impaired mentation, nausea and weakness to various environmental exposures, most typically “chemical” smells (1–6).

Similarly, foods, medications and even electromagnetic radiation have been blamed. Some alternative care providers and physicians claim to diagnose and treat IEI with various unproven or disproven modalities, often at considerable expense to the patient.

Not only are these claims inconsistent with known principles of physiology, toxicology, allergy and physics, but we see no consistent allergic, immunologic or toxicologic abnormality in IEI patients. As such, no mainstream medical or scientific organization has accepted claims that IEI is a condition that results from allergic or toxic response (7–9).

Moreover, when suitably blinded (that is, when the reported triggering odour can be masked by a stronger, tolerated odour), IEI patients are no more likely to react to their purported trigger than to a placebo (10). These results suggest that cognitive factors are important in symptom generation and are inconsistent with claims of toxicity or allergy. Similarly, although such individuals claim to be abnormally sensitive to various odours, neurophysiological testing with evoked potentials shows that olfactory thresholds are normal in this group of individuals (11).

IEI patients exhibit increased prevalence of anxiety disorders, depression and somatization

The similarity in clinical symptoms between IEI and anxiety and somatization disorders has long been noted and has prompted earlier studies to look for the presence of psychiatric conditions in this group of patients. Extensive literature shows increased psychiatric morbidity among IEI patients (8,12). IEI patients, for example, had a greater prevalence of current anxiety or depressive disorder (13); had a significantly higher lifetime prevalence of major depression, mood disorders, anxiety disorders and somatization disorders (14); and had major depressive episodes (15). In addition, in one study, IEI patients scored significantly higher than did control subjects on the anxiety sensitivity index (ASI) and other self-completed questionnaires for anxiety and agoraphobia; namely, the Mobility Inventory (MI) for agoraphobia, the Agoraphobia Cognitions Questionnaire and anxiety and...
IEI patients may improve when treated for panic and phobic avoidance of triggers

There is anecdotal evidence that IEI patients improve when treated with measures known to be effective in panic disorder, phobias and functional somatic syndromes (8,22–24). Treatment modalities include relaxation training, stress management counselling, pharmacotherapy and psychological desensitization, with graded increased exposure to the purported triggers. Unfortunately, many patients are unwilling to accept a psychophysiological explanation for their symptoms, and recruitment into controlled trials with respect to treatment has been difficult (20).

It is likely important that the treating mental health care provider become familiar with and specifically address the particular aspects of IEI—including the phobic avoidance of purported triggers. In one small case series, psychiatrists had treated several IEI patients for panic disorder, but the treating psychiatrist accepted, at face value, the diagnosis of multiple chemical sensitivity (that is, a true allergic condition) (24). These patients were still extremely limited in their vocational and social functioning by their continued need to avoid their environmental triggers. Most patients improved, however, when referred to a psychiatrist who was familiar with IEI and who specifically addressed their phobic avoidance of purported triggers.

Although panic disorder is likely a major contributing factor in many patients with IEI, a formal diagnosis of panic disorder, as currently defined by DSM-IV criteria, is problematic because of a technicality. The DSM-IV specifically stipulates that, to diagnose panic disorder, panic symptoms must occur spontaneously, not secondarily to a particular trigger. Because IEI patients always attribute their symptoms to an exposure, one could argue that a diagnosis of panic disorder is excluded, owing to the absence of spontaneous symptoms (25). However, many IEI symptoms may arise spontaneously and are only attributed to an unknown exposure in retrospect; therefore, it could also be argued that a formal diagnosis of panic disorder might apply in IEI patients.

Other factors can contribute to and can modify the developing clinical picture

IEI is a heterogeneous condition. Other factors can modify and contribute to the clinical presentation, such as the presence of psychiatric and psychological conditions other than panic (including depression and somatization), life experiences (childhood trauma) and other medical disorders (thyroid disease, asthma or true IgE-mediated allergy).

Learned sensitivity may play a role in the process, whereby IEI patients develop symptoms on exposure to substances that they believe are toxic. Various forms of

IEI patients may have a higher prevalence of a panic-disorder–associated genetic marker

Preliminary genetic evidence exists that shows IEI may be a manifestation of panic disorder. In a pilot study, IEI patients were found to have increased prevalence of panic-disorder–associated cholecystokinin B receptor allele 7, compared with matched control subjects (21).

IEI patients hyperventilate when aware of exposure to their purported trigger

There is direct physiologic evidence that anxiety and panic may play a role in IEI. Of a group of IEI patients who were openly exposed to their purported trigger, 11 of 15 experienced typical symptoms (18). These patients hyperventilated and had reduced end-tidal CO₂ levels. Their symptoms could be explained by hyperventilation that resulted in hypocapnia, which is known to precipitate symptoms such as lightheadedness, difficulty in concentrating and numbness and tingling. Notably, in this study, the patients were aware of being exposed to their purported trigger; hence, cognitive factors (that is, apprehension at being exposed to a trigger to which patients believed themselves to be “sensitive”) could have contributed to anxiety and hyperventilation.

IEI patients experience panic attacks when tested with panicogenic agents

Further direct physiologic evidence suggesting that IEI may be a manifestation of panic disorder originates from studies that used panicogenic agents—agents capable of inducing panic attacks in individuals with panic disorder, but not in normal control subjects. Intravenous sodium lactate was the first panicogenic agent used in the study of IEI patients. In a pilot study, all five IEI patients experienced panic attacks with sodium lactate infusion, assessed by DSM-III R criteria (19). Subsequent independent psychiatric assessment clinically confirmed the diagnosis of panic disorder in each of the five patients.

Next, a larger single-blind study was performed, using single-breath inhalation of 35 per cent CO₂ as a panicogenic agent (20). The study comprised 36 IEI patients and 37 healthy control subjects. Subjects with a diagnosis of IEI were excluded from the study if they had a previous diagnosis of mental illness or were taking psychiatric medications. Despite these exclusions, however, DSM-IV criteria for a panic attack were elicited after CO₂ inhalation in 71 per cent of IEI patients, compared with 26 per cent of control subjects (P< 0.001).

Thus, data from the study of panicogenic agents in IEI suggest that most IEI patients have a neurobiologic diagnosis similar, if not identical, to panic disorder.

IEI patients have a higher prevalence of emotional, physical and sexual abuse, which predisposes individuals to develop anxiety disorders later in life (8,17).

stress subscales of the Depression Anxiety Stress Scales (16). Further, some evidence suggests that IEI patients are more likely to have experienced early life trauma, including emotional, physical and sexual abuse, which predisposes individuals to develop anxiety disorders later in life (8,17).
learning may contribute, including symptom attribution (often acquired from the media or so-called “advocates” about the adverse effects of toxic exposures), social modelling (in cases of hysterical contagion, such as when multiple individuals in close proximity acquire IEI, as in some cases of sick-building syndrome), and classic conditioning (wherein there is an initial acute toxic exposure) (8,26). In fact, many individuals with IEI report an initial unpleasant triggering event that is followed by further symptoms on exposure to other unrelated odours. Likewise, learned physical responses to solvent or other chemical exposures have been reported in patients (27,28) and to nontoxic odours in healthy subjects (29). It is possible for these learned symptoms to be precipitated by new odours, particularly in individuals with a high negative affectivity (30).

Consequently, panic symptoms become associated with otherwise nonnoxious stimuli in the environment (usually odours), and individuals may exhibit anticipatory anxiety and eventually phobic avoidance of their purported environmental triggers. Reinforcement of patients’ beliefs about the effects of toxic exposures on chemically sensitive patients originates from the media, advocates and patient support groups (8). Somatization may develop, amplifying bodily sensations, and results in affected individuals seeking medical explanations. A bias develops, and affected individuals focus only on information that reaffirms their belief systems with respect to their sensitivities, ignoring credible scientific evidence to the contrary. Avoiding purported triggers may result in primary gain (avoidance of panic symptoms and the underlying psychological conflicts) (31), as well as secondary gain (exemption from usual responsibilities and financial compensation). The belief that the individual is chemically sensitive becomes a dominant concept and develops into an overvalued idea (8). Significant impairment in function can occur. Many affected patients become housebound and unable to work or to venture into public places because of fear that exposure to their trigger(s) will precipitate symptoms. The similarities to the housebound agoraphobic are obvious.

Conclusions

Mental health care providers should be aware that panic disorder likely explains IEI symptoms in many patients. This represents a therapeutic opportunity—one in which mental health care workers are uniquely qualified to assist (25). After underlying medical conditions have been addressed, psychiatric assessment is recommended for all patients with IEI. If panic is a contributing factor to symptoms, psychotherapy with or without pharmacotherapy that specifically addresses the particular psychological features of IEI should be offered.

References


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sectors. They stated that funding should be based on patient needs. They noted that it is important to consider not only how many physicians the system has but also the number of nurses and mental health care providers. It was suggested that there is a need for a more level playing field among the provinces on many levels, including how services, academic centers and psychiatry are supported and funded. The point was also made that doctors immigrating to Canada should be better informed about the training requirements and expectations of the specialty. In addition, better financial support of academic resources and the teaching hospitals is needed to support roles of faculty as teachers and as patient care providers and not only as researchers.

A CPA working group is preparing a response to Task Force Two. Members of the working group, Dr. Blake Woodside, Dr. Roger Bland, Dr. Nick Kates, Dr. Luc Morin, Dr. Gary Hnatko and Dr. Pierre Beauséjour, will present alternative models for the provision of care, make recommendations on specific issues affecting psychiatry and offer options to resolve the HR crisis. They will try to provide some answers to the Task Force’s main questions: How can we make the system better even if there is not an increase in human resources numbers? And how can psychiatrists link with primary care?

For more information on the physician HR strategy for Canada, visit Task Force Two’s Web site at www.physicianhr.ca. Members are also invited to send an e-mail voicing their ideas and concerns to president@cpa-apc.org.  

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and was membership chair of a local riding association. Dr. Beck sees herself as a catalyst putting together people with common interests and good ideas. “Politics is about having access to people with influence in the process,” explains Dr. Beck, “And I’m only too happy to do that because I think the more access politicians have to solid opinions then the more likely they are to make informed and wise choices.”

Dr. Beck has been a leader not only in the political backrooms but also on the medical front. She was on the executive of her medical school class at McGill. She was chief resident in psychiatry at the Montreal General Hospital and chief resident in child psychiatry at Montreal Children’s Hospital. The pace slowed down after graduation in 1983, and again after the birth of her first child one year later, but picked up as her children matured. In recognition of her exemplary community efforts and achievements, Dr. Beck received a Commemorative Medal for the Queen’s Jubilee in January 2003. Never one to sit on her laurels, she became President of the Academy of Medicine of Ottawa in March 2003.