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This issue of the *Residents' Journal* focuses on the theme of military psychiatry. The issue begins with an article by the Guest Section Editor, George Loeffler, M.D., on the emerging concept of moral injury. In a case report, Daniel G. Allen, M.D., Wander S. Segura M.D., and Rebecca R. Burson, D.O., describe the effects of methylenedioxypyrovalerone use in an active-duty service member, as well as the unique challenges use of this substance presents to both service members and military health care providers. Philip Y.T. Liu, M.D., and Dr. Burson present a case report of first-episode substance-induced mania with psychotic features in a decorated soldier evacuated from a combat-stressed environment. Ryan Richmond, B.S., discusses virtual reality exposure therapy for treatment of combat posttraumatic stress disorder. Last, Nicole Garber, M.D., presents data on the effects of military deployment on children.

Moral Injury: An Emerging Concept in Combat Trauma

George Loeffler, M.D.

Since antiquity, it has been recognized that military combat can result in psychological damage. In his landmark book *Achilles in Vietnam*, Jonathan Shay (1) powerfully argues that the *Iliad* can be read as just such an account. In his book's subtitle, "Combat Trauma and the Undoing of Character," Shay intimates the profound way the war fighter's experiences shape him or her. He introduces the phrase "moral injury" to describe how "the moral dimension of trauma destroys virtue, undoes good character," considering it "an essential part of any combat trauma that leads to a lifelong psychological injury" (1, p. 20)

Training in a military hospital, I have seen that the consequences of combat are ubiquitous. In my own clinical experience, I have found that neither the diagnosis of posttraumatic stress disorder (PTSD) nor the current trauma-focused psychotherapies adequately address the ethical dimension of combat trauma. These ethical and existential concerns are the focus of moral injury.

Emergence of the Moral Injury Construct

Litz et al. (2) wrote an article, published in 2009, on the understanding and treatment of combat trauma. Using the phrase "moral injury," the authors postulated a distinct syndrome arising from the combat experience. They defined moral injury as "perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations." They also stated that, "moral injury requires an act of transgression that severely and abruptly contradicts an individual's personal or shared expectation about the rules or the code of conduct, either during the event or at some point afterward."

Litz et al. situated the notion of moral injury within a number of current theories of trauma. Their hypothesis was most heavily drawn from social cognitive theories of PTSD. According to this theory, PTSD is a result of a traumatic event conflicting with an individual's beliefs, such as "the world is benevolent," "the world is meaningful," and "the self is worthy." Moral injury fits this mold. The psychological difficulties result from a combat experience conflicting with an individual's ethical beliefs.

The Moral Injury Construct

Drescher et al. (3) assumed the task of beginning to operationalize and clinically situate the concept of moral injury. With the goal of exploring "professional opinion as to the presence, the utility, and the phenomenology of the construct of moral injury," they conducted semistructured interviews of 23 experts in mental health and chaplaincy.

Experts were unanimous in the expressed need for the concept of moral injury. This extended to the belief that the current conception of PTSD has failed to adequately capture this dimension of combat trauma.

Treating Moral Injury

Theoretical Considerations

Litz et al. (2) outlined an approach designed to treat moral injuries. They identified two routes to healing moral injury: the psychological and emotional processing of the memory and meaning of the moral transgression and corrective life experience. Focusing on the first, Litz et al. drew from a number of psychotherapeutic interventions. From exposure therapy, they suggested a raw and emotional reliving of the morally transgressive experience, followed by a critical examination of implicit appraisals. Recognizing the rigidity and resistance to disconfirmation of these negative appraisals, the authors proposed an imagined conversation with a benevolent moral authority or fellow junior service member who is similarly "stuck." The goal is to "get service members and veterans to articulate ideas about the capacity to do good, talk about being forgiven and the need for self-forgiveness, even if they don't initially accept these ideas."

Description of Adaptive Disclosure

Adaptive disclosure is a manualized intervention consisting of six 90-minute sessions designed specifically to treat active-duty service members with combat-related PTSD. Details of this approach are described elsewhere (2, 4, 5). Acknowledging the challenges active-duty service members face participating in protracted courses of treatment, the goal of this brief intervention is explicitly identified as "initiat[ing] a process experientially rather than expecting full system remission, in effect 'planting seeds'" (5).

The first session consists of an introduction to adaptive disclosure and identification of the index event. The next four sessions delve into this event. The event is described in significant detail so as to emotionally engage the patient. Following this, based on the nature of the event and the patient's reaction, the therapist guides the patient in addressing one of three experiences: life threat, loss, or moral injury.

To address moral injury, the therapist uses the empty chair technique in guiding the patient through an imagined conversation with a benevolent authority figure. The patient describes his or her guilt and shame and then offers what the authority figure might say in turn. The therapist is encouraged to be highly directive in eliciting "forgiveness-related content.

In the sixth and final session, the patient is instructed to reflect on gains and to prepare for future struggles.

Open Trial of Adaptive Disclosure

Gray et al. (5) described the initial proof of concept trial of adaptive disclosure, which was conducted at the Marine Corps Base Camp Pendleton in San Diego and funded by the Navy Bureau of Medicine and Surgery. This was an uncontrolled open-clinical trial of 44 active-duty Marines. All participants met criteria for PTSD from deployment experiences in Iraq or Afghanistan.

Results of this brief intervention were encouraging. The primary outcome measure, PTSD symptoms as measured by the PTSD Checklist–Military version, revealed that there was nearly a 10-point improvement in symptoms, representing an effect size of 0.79 (Cohen's *d*) in the large range. Improvement of depressive symptoms was also in the large effect size range (Cohen's d=0.71, p=0.001). Of note, these results were for all three arms of the intervention pooled and not exclusively for the moral injury intervention.

Gray at al. (5) acknowledged a number of limitations to the study, however, including small sample size, lack of long-term follow up, and lack of random assignment for the comparison group. Another limitation was the absence of a rating instrument to directly assess moral injury, subsequently addressed by Nash et al. with the Moral Injury Event Scale (6).

Future Directions

In a few short years, Litz and his collaborators have laid the conceptual and clinical foundation for the concept of moral injury. Nevertheless, much work remains to be done.

Part of the theoretical work will involve further clarifying what moral injury is. I believe that it is a more challenging, even murkier, concept than other concepts in mental health because of its inherent inclusion of the philosophical domain of morality. At once we are trying to describe the subjective psychological experience of an individual, something we are accustomed to in mental health, as well as the individual's conception of morality, something I believe that we are less accustomed to. What separates morality from mere opinion of likes and dislikes is that it contains some measure of universality that binds or compels an individual. The Golden Rule appeals to a special set of beliefs that bind both oneself and others with a special force. While these ethical beliefs are embedded in the particular history and psychology of an individual, at the same time they originate and apply beyond the individual. I do not feel that these elements of moral injury have thus far been sufficiently addressed.

To adequately do so would be part of a larger project to draw together insights from many different fields. Within psychology, in addition to the cognitive, behavioral, and gestalt schools, I would include existential psychotherapy, affect theory, moral psychology, and psychodynamics, particularly as it relates to object-relations and super-ego functioning, to name just a few. As my mentor Christopher Streeter once pointed out, developmental theories, such as Erikson's psychosocial stages, are also relevant, especially in light of the fact that many combat veterans are in their late teens and early twenties, falling somewhere between identity versus role diffusion and intimacy versus isolation.

Additionally, we need to reach beyond psychology. Ethics, the branch of philosophy through which we seek to understand good conduct and the good in human life, is also necessary. Including religion, theology, and spirituality is important as well.

Much clinical research must also be done. The adaptive disclosure pilot study is an important first step. The Naval Center for Combat and Operational Stress Control is planning an expanded follow-up study. We need to apply other treatment modalities to moral injury, in addition to developing new ones. The Moral Injury Event Scale offers the necessary currency by which to compare these various approaches.

Of course, this all must be translated into clinical practice. I see recognition of moral injury permeating the hospital where I train. For example, the residential treatment program for active-duty service members with combat PTSD has added a weekly moral injury group.

While it has long been known that not all combat wounds are physical, the moral dimension of psychological injury remains largely unexplored, at least within mainstream mental health. The work done to understand and treat moral injury, while preliminary, provides hope for those suffering from these unseen scars and those charged with helping them.

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Methoxetamine: The Rise of a Ketamine Analogue "Legal High"

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"Legal highs," or "designer drugs," are novel psychoactive substances that are designed to elicit a psychoactive response similar to that of commonly available substances of abuse while eluding legal control (1). They are principally synthetic chemicals but may also include plant or fungal material (1). In recent years, we have seen migration to the United States of synthetic cannabinoid receptor agonists and synthetic cathinones, commonly known as "spice" and "bath salts," respectively (2). Both substance classes presented in continental Europe and the United Kingdom about 2 years prior to emerging in the United States (2). Methoxetamine (or 3-MeO-2-Oxo-PCE), an analogue of ketamine (which is a dissociative anesthetic), was first identified as a new "legal high" in November 2010 by the European Monitoring Centre for Drugs and Drug Addiction (3). In Europe, methoxetamine has risen to become a prominent substance of abuse. It is widely discussed in the popular media and has a small but growing presence in the European peer-reviewed literature. While to date there are few reports concerning methoxetamine abuse in the United States, this may change in the near future if it conforms to the 2-year lag time of prior designer drugs migrating from Europe, especially from the United Kingdom.

Pharmacology

Methoxetamine is a 3-methoxy, *N*-ethyl derivative of ketamine in the arylcyclohexylamine class (4). It has been described as having a higher potency than ketamine, with a longer duration of action (2–3 hours), as well as a longer delay in the onset of its effects (10–20 minutes) when taken by insufflation (nasally) (5).

This delayed onset has reportedly led to repeated dosing and unintentional overdose by users (6). It has been suggested that the substitution of ketamine's *N*-methyl group with an *N*-ethyl group prolongs the duration of action while preventing the occurrence of chronic bladder toxicity associated with long-term ketamine use (6, 7). However, recent evidence from a study conducted in mice demonstrated significant kidney and bladder damage following daily methoxetamine administration over a 3-month period (8).

Although the mechanism of action of methoxetamine has not been formally determined, its close structural similarity to ketamine suggests that it is also an *N*-methyl-D-aspartate receptor blocker and a dopamine reuptake inhibitor (6). The properties of methoxetamine and ketamine are presented in Figure 1.

Clinical Presentation

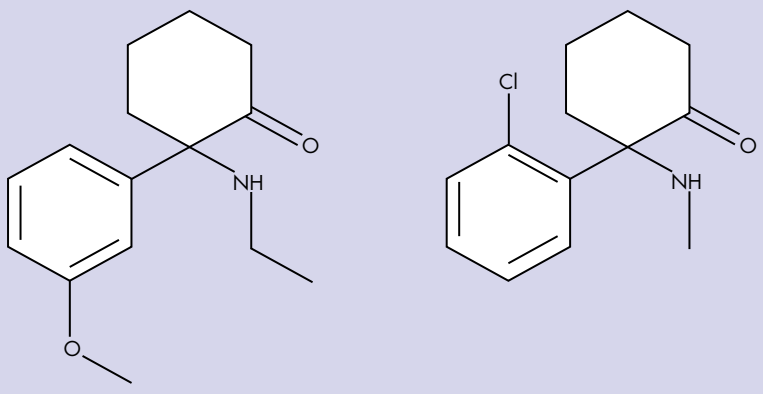
Methoxetamine (also known as "MXE," "m-ket," "K-max," or "mexxy") can be readily purchased over the Internet or in head shops. It is sometimes labeled "fish tank cleaner" and may include the "not for human consumption" disclaimer commonly placed on other designer drugs. It is a white powder and is frequently sold in small, colorful packets (6, 9).

The most common methods of administration are orally and insufflation, although methoxetamine is also ingested rectally and through intramuscular and intravascular injection (10).

Users describe euphoria, increased empathy, a pleasant intensification of sensory experience (especially music), vivid visual hallucinations, and transient antidepressant effects (6). Untoward effects include dizziness, confusion, time distortion, aphasia, and psychomotor agitation (6). Reported withdrawal symptoms include low mood, cognitive impairment, and insomnia, as well as a single anecdotal report of attempted suicide (6).

Individuals presenting with acute methoxetamine toxicity exhibit ketamine-like dissociation, including derealization, depersonalization, or even a catatonic-like state (6). In contrast to acute ketamine toxicity, individuals may also exhibit sympathomimetic features, including tachycardia, hypertension, and pyrexia, as well as marked agitation and aggression (6, 7, 11, 12). A series of three cases in the United Kingdom identified significant cerebellar toxicity associated with methoxetamine use. The patients presented with cerebellar ataxia, incoordination, dysarthria, and horizontal nystagmus, although rotary nystagmus has also been described (9, 10). Creatine

FIGURE 1. Methoxetamine and Ketamine Properties



kinase levels may also be elevated, peaking several hours after drug consumption (9). Autonomic symptoms tend to resolve within 2 to 3 hours, while cerebellar symptoms may take up to 4 days. Except for one reported overdose death in which autopsy results demonstrated the presence of methoxetamine in addition to three synthetic cannabinoids, complete resolution has been described in all other reported cases (5, 7, 9, 10, 13).

Because methoxetamine has only recently emerged, we still do not have a clear clinical picture of its acute toxicity, not to mention the effects of chronic use. Methoxetamine is marketed to recreational drug users as a "bladder-friendly alternative to ketamine," although no studies in humans have been conducted, and preliminary data from animal studies indicate significant bladder and kidney toxicity (8).

While no specific recommendations exist for the acute treatment of methoxetamine toxicity, given its similarity to ketamine and phencyclidine (PCP), it would be reasonable to infer management from these better known compounds, i.e., supportive care with benzodiazepines, antiemetics, and intravenous fluids with respiratory support as required (11).

The Future

Although the United Kingdom appears to be the primary market for methoxetamine at present, the confluence of easy availability over the Internet, low cost, and a perceived absence of federal regulations make the United States a fertile potential market.

To date, discussion of methoxetamine in the medical literature has principally been presented in either toxicological or case reports. As was the case when spice and bath salts initially emerged, we need a more robust literature describing clinical presentation and management. We also need an understanding of the pharmacology of methoxetamine, since we currently are limited to inferring properties based on structural similarities to ketamine and PCP.

Interestingly, it has been suggested that methoxetamine may be efficacious as a clinical antidepressant. Subanesthetic doses of ketamine have shown great promise, and Coppola and Mondola (14) hypothesize that methoxetamine may prove even better.

Methoxetamine appears to be the first and most prominent in a collection of ketamine-based compounds. The initial handful of spice and bath salt compounds rapidly proliferated into dozens if not hundreds of new compounds, emerging in waves in response to legislation and drug detection capability (2). True to this pattern, 3-methoxy-PCP, 4-methoxy-PCP, 2-methoxy-ketamine, and *N*-ethyl-norketamine have arrived on the market recently (3). Relative to ketamine, even less is known about these compounds.

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Depression, Suicide, and Ketamine

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Over the past 50 years, monoamines have remained the target of treatment for depression, despite only one-third of patients achieving remission with standard antidepressant therapy, while taking 4 to 6 weeks to do so (1). A novel, rapid, and effective therapeutic target has emerged with modulators of the glutamatergic system, in particular, the *N*-methyl-D-aspartate (NMDA) antagonist ketamine.

Preclinical Research

Glutamate is the primary excitatory neurotransmitter of the brain and helps regulate plasticity of neurons involved in learning and memory (2). Initial research began with the observation that mood disorders were correlated with altered glutamate levels in both plasma (3) and brain tissue (4). Research using animal models revealed that NMDA receptor antagonists, such as ketamine, reversed symptoms of depression. One study demonstrated that depressive behavior in rats was relieved for up to 10 days following a single dose of ketamine (5). These observations led to clinical trials of ketamine to treat depression in humans.

Ketamine and Unipolar Depression

The initial study of ketamine to treat depression in humans was a randomized double-blinded placebo-controlled cross-over study conducted by Berman et al. (6). All seven participants with treatment-resistant depression receiving a single infusion of ketamine at a subanesthetic dose (0.5 mg/kg) exhibited a rapid and significant antidepressant effect. Within 72 hours, participants receiving treatment had a 14-point (SD=10) improvement in scores on the Hamilton Depression Rating Scale (HAM-D), whereas those receiving placebo showed no improvement (HAM-D score, 0 [SD=12]). Furthermore, for four participants in the active treatment group, this effect lasted 3 days postinfusion. In a subsequent study, Zarate et al. (7) used a single dose of ketamine in 17 patients with treatment-resistant depression. At 110 minutes postinfusion, 50% of the patients exhibited significant improvement in depressive symptoms, and this postinfusion improvement increased to 71% of patients at 24 hours. For 35% of patients, this effect lasted >7 days. These studies were repeated with similar outcomes (8, 9). Aan het Rot et al. (10) examined the efficacy of administering five subsequent ketamine infusions following the initial dose. Eight of the nine patients who achieved remission relapsed within 19 days of the sixth infusion, although one patient maintained remission for 45 days.

Other studies have examined related questions. Ibrahim et al. (11) found that patients with treatment-resistant depression refractory to ECT responded to ketamine. Kranaster et al. (12) examined retrospectively whether the use of ketamine as an anesthetic for ECT in treatment-resistant depression offered any added benefit. Compared with patients not receiving ketamine, those who received ketamine exhibited not only a significant decrease in depressive symptoms, but they also required fewer ECT treatments.

Kudoh et al. (13) added ketamine as an induction agent for patients with major depressive disorder undergoing surgery and found that they had significantly lower depressive scores 1 day postoperatively.

Ketamine and Bipolar Depression

In the wake of the promising effects of ketamine on unipolar depression, Diaz-Granados et al. (14) tested a single dose in patients with treatment-resistant bipolar depression who were receiving valproate or lithium maintenance therapy. A significant decrease in depressive symptoms was noted within 40 minutes, with 42% of patients meeting response criteria within 24 hours. Zarate et al. (15) performed a similar study of 15 patients with treatment-resistant bipolar depression. Within 40 minutes, significant decreases in both depressive symptoms and suicidal ideation were observed, and these decreases remained 3 days postinfusion.

Ketamine and Suicidal Ideation

Price et al. (16) conducted an open-label study demonstrating the rapid antisuicidal effect of ketamine 24 hours after a single dose in 26 patients with treatment-resistant depression. This was corroborated in an open-label study conducted by Phelps et al. (17) who found that patients with treatment-resistant depression who had a family history of alcohol dependence responded significantly more than those without a family history of alcohol dependence. DiazGranados et al. (18) conducted an open-label study of 33 patients with treatment-resistant depression. They reported a significant decrease in suicidal ideation scores within 40 minutes after infusion, which remained significant up to 4 hours postinfusion. Larkin et al. (19) confirmed these results in another open-label study, which was conducted in an emergency department setting. The Zarate et al. (15) study of bipolar depression was the first controlled study to demonstrate this effect.

Risks and Side Effects

Ketamine is best known clinically for its use as an anesthetic, but it is also an established substance of abuse. In addition to sedation, 20% of patients receiving anaesthetic doses (2 mg/kg administered over 5 to 10 minutes) have psychotomimetic/dissociative effects, including depersonalization, derealization, confusion, and hallucinations. In their 2006 study, Zarate et al. (7) reported a higher

occurrence of perceptual disturbances, confusion, elevations in blood pressure, euphoria, dizziness, and increased libido in a ketamine group. Notably, the side effects reported subsided within 80 minutes postinfusion.

Future Directions

Ketamine's rapid antidepressant and antisuicide properties in treatment-resistant unipolar and bipolar depression are important. Not only may ketamine alleviate depressive and suicidal symptoms in minutes to hours, use of this drug also opens vast new vistas in the understanding of depression.

Currently, there are efforts to develop compounds that maintain or magnify ketamine's antidepressant and antisuicidal properties while minimizing psychomimetic and other untoward side effects. In effect, we may be witnessing the birth of a whole panel of novel antidepressant agents.

New avenues of research into the pathophysiology of depression go hand in hand with the development of novel compounds. The clinical success of ketamine has already spurred a number of hypotheses and preclinical studies. One of the most tantalizing is the relationship between depression and synaptic plasticity.

We still, however, do not know which patients and what settings and routes of administration, doses, and dosing regimens are most appropriate. Furthermore, ketamine is a substance of abuse with known safety concerns, especially in the setting of chronic use. While results to date have been promising, larger-scale studies are needed before the use of ketamine as an antidepressant can enter mainstream clinical practice.

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Case Report

Use of "Bath Salts" Among Members of the United States Military: A Case Report With Discussion

Daniel G. Allen, M.D.
Wander S. Segura, M.D.
Rebecca R. Burson, D.O.

The military is not immune to substance misuse, especially substances that are not readily detectible or explicitly illegal. Until recently, methylenedioxypyrovalerone (MDPV), the key psychoactive constituent of "bath salts," was not a banned substance. MDPV intoxication is known to cause hallucinations, agitation, and aggressive behavior. Despite subsequent state and federal prohibitions, MDPV remains easily accessible and affordable, and detection of its use is difficult. Given the military's demographic overlap with that of MDPV users and the occupational risks of intoxication, the military should have a vested interest in both the identification of and treatment for MDPV users. We present a case demonstrating the effects of MDPV use in an active-duty serviceman.

Case

"Mr. A" is a 25-year-old active-duty serviceman with a history of alcohol abuse. The patient presented to the mental health clinic complaining of dysthymia, insomnia, and anxiety. These symptoms preceded his presentation by several months and were related to occupational stress and marital discord. At the time, he denied alcohol and illicit substance use. Thus, his symptoms were conceptualized as an adjustment reaction, and he was diagnosed with adjustment disorder with mixed anxiety and depressed mood. He began weekly psychotherapy and disengaged from treatment after partial improvement.

Five months later, the patient presented to the emergency department with shortness of breath, chest pain, and worsening of his depressed mood and anxiety in the context of ongoing relational stressors. A medical workup was performed, and he was medically cleared. A follow-up with mental health was recommended. Further interview revealed symptoms and behaviors such as memory difficulties, decreased motivation, paranoia (in the form of being suspicious of superiors), agitation, irritability, anger, public physical altercations, and domestic violence. These symptoms and behaviors led to his difficulty studying for promotion, threatening violence at the work place, failure to attend mandatory functions, and criminal misconduct. His symptoms and behaviors again appeared consistent with an adjustment reaction, since all other axis I conditions were ruled out. Psychotherapy and sertraline were initiated, but he was not fully compliant with this treatment regimen.

The patient continued to have worsened symptoms and occupational dysfunction as his marriage ended in divorce. This culminated in an episode in which he reported to work late with altered mental status and new-onset suicidal ideation. He then revealed to his supervisor that he had been using bath salts. He was transported to the emergency department where physical examination and routine laboratory examination (complete blood count, metabolic profile, thyroid-stimulating hormone, urine drug screen) were negative, and he was admitted voluntarily to inpatient psychiatry for safety concerns. After a brief hospitalization, he transitioned to a 28-day inpatient rehabilitation program. Following this program, he engaged in individual and group therapy and was referred to the Air Force Alcohol and Drug Abuse Prevention and Treatment program. While in the treatment program, he revealed that in the months prior to his hospitalization, he had used an MDPV-containing product called "ivory wave." He reported obtaining the substance from a gas station. Following legal advice from the area defense council, he declined to further discuss his substance use. As a result of his misconduct, he was demoted and assigned extra duty, and he continued to have legal difficulties related to his behaviors while intoxicated. Despite his initial reluctance to engage in treatment, the patient experienced resolution of his irritability as well as aggression and experienced improvement in his depression symptoms coincident with treatment adherence, including cessation of MDPV use.

Discussion

Understanding the mechanisms of action, use patterns, and consequences of MDPV is essential for health care providers. This substance is a synthetic cathinone and was relatively unknown until 2008 (1). Animal studies have suggested that MDPV's mechanism of action is mostly that of dopamine and norepinephrine reuptake and agonism, as well as serotonin reuptake, although to a lesser degree (2). MDPV's mechanism of action and effect share similarities with that of methamphetamine, cocaine, and ecstasy. Physiologically, this results in sympathomimetic manifestations such as elevated blood pressure and tachycardia. Psychiatric manifestations include elevated anxiety, agitation, paranoia, hallucinations, and aggressive behavior (3). Health care providers should keep substance intoxication on their differential when these symptoms are observed. However, MDPV is undetectable on a urine drug screen and must be requested separately.

Those who are reported to have the highest rates of MDPV use are young adults

with a mean age of 25 years, as reported in a study conducted in the United Kingdom (4), and 28 years, as reported in a study conducted in Michigan (5). Despite its elicit status since 2010, MDPV can still be obtained at gas stations, head shops, and adult book stores camouflaged under names such as research chemicals, plant food, and insect repellant (6). Despite the popular name bath salts, there is no relation to the self-care product. Additionally, it is inexpensive compared with other street drugs, costing about $10 per use (6). MDPV has psychomimetic effects between 5 mg and 20 mg, with reports of use as high as 200 mg (3). Its routes of administration include oral, intramuscular, rectal, and sublingual; however, most users inhale or snort the powder-like substance (6). Much of the evidence of reported MDPV intoxication symptoms is anecdotal. For instance, news outlets have reported paranoid delusions in a mother who left her child in the highway after using MDPV and a 21-year-old who died of a self-inflicted gunshot wound following 5 days of acute psychosis due to a single MDPV use (7, 8). One study of 236 MDPV users seen in an emergency department found that 12% and 21% were admitted to an inpatient psychiatric unit or critical care unit, respectively, with stays as long as 2 weeks (9). Given the ease of access, affordability, and nondetectability in routine drug screens, MDPV has gained popularity, resulting in both individual and community consequences. For the same reasons, it is suspected that similar problems exist within the military. Currently, MDPV is a banned substance for both U.S. military service members as well as civilians.

While the prevalence of illicit substance use in the U.S. military is lower than that in the civilian population (2.3% and 8.9%, respectively), the use of nonillicit substances, such as alcohol (military, 26% compared with civilian, 16%), tobacco (military, 44% compared with civilian, 39.4%), and prescription medication (military, 10% compared with civilian, 2.5%) is higher (10). It is believed that the increased use of nonillicit substances and the misuse of prescription medication are related to the increased physical and psychological demands placed on military personnel at a time of high operational tempo. The relatively lower rate of illicit substance use is attributed to the military's policy of random drug screening. This deterrent is not likely effective in the case of substances that are not currently detectable by routine screening tests. Despite efforts to develop a screening tool (11), no tool as cost-effective as the urine drug screen exists to assist with the identification of substance misuse when a patient presents with unexplained symptoms. Thus, detection of MDPV is dependent on the admission of the user. Despite the protections allotted to service members that promote help-seeking behavior (12), our patient's self-disclosure resulted in serious adverse action. Therein lies a dilemma for a service member suffering from addiction disorders: to seek help at the risk of one's livelihood or to risk further dysfunction but continue to meet financial obligations. On the part of the physician, this also presents a dilemma unique to the military: to treat the patient and keep the confidentiality or to disclose the substance use as mandated (12). One can argue that in the military, such action is necessary given the real security and safety risks inherent in the armed forces. Balancing the protection of the fighting force and the health of the individual remains a difficult task expected of military psychiatrists. The military will likely benefit from routinely available screening tools for MDPV and the removal of disincentives to reporting and treatment. Until then, health care providers must be aware of the use of MDPV in the form of bath salts in order to provide both education and treatment.

Dr. Allen is a third-year resident, Dr. Segura is a third-year resident, and Dr. Burson is a fourth-year resident in the University of Texas Health Science Center San Antonio-Lackland Air Force Base Joint Psychiatry Residency Program. All authors also hold the rank of Captain in the United States Air Force.

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Case Report

Deployment Stress, Dextromethorphan, Ketamine, and Pharmacologic Interactions: A Multifactorial Presentation of Mania

Philip Y.T. Liu, M.D.
Rebecca R. Burson, D.O.

Although military standards exclude the entrance of individuals with previous affective and psychotic disorders, this does not ensure that military service members are not at risk (1). Epidemiologic findings suggest that males are at increased risk for experiencing a first episode of mania or psychosis before age 25 years, often resulting in the development of a primary mood or thought disorder (2, 3). Given that the vast majority of the military overlaps with this age and sex demographic, in addition to stressors unique to the military, it is not surprising that every year numerous service members experience a first-break psychotic episode. We present a case of first-episode substance-induced mania with psychotic features in a young soldier.

Case

"Mr. M" is a 29-year-old decorated soldier evacuated from a combat-stressed environment for "psychotic" and "manic-like" behaviors after recreationally ingesting 2½ 4-ounce bottles of dexromethorphan hydrobromide (with active guaifenesin) within a 24-hour window. Overnight, he exhibited acute and persistent grandiosity, pressured speech, impaired reality testing (claiming to be a unicorn and other forms of identity confusion), impulsivity and agitation (posturing and throwing chairs), distractibility, decreased sleep, and increased energy. He was then air-evacuated from Afghanistan for further mental health evaluation and care in the United States. In order to ensure safety while in transport, he was administered ketamine (400 mg intravenously), haloperidol (10 mg intravenously), and lorazepam (2 mg intravenously).

Upon arrival to the inpatient psychiatry ward at a stateside military treatment facility, the patient continued to exhibit thought and behavioral disturbances that required involuntary hospitalization. He referred to himself as a millionaire, the recipient of the Congressional Medal of Honor, and a successful film writer and claimed to have many "can't lose" investment schemes. His medical history revealed a combat patrol accident 3 months prior, in which he sustained fragment injuries from an explosion without evidence of traumatic brain injury or cognitive impairment. Since then, he had sought behavioral health treatment for "anxiety," which resulted in treatment for combat and operational stress reactions; no medications were prescribed. During intake admission, he endorsed continued nightmares and hypervigilance relating to improvised explosive device incidence but did not display or endorse any dissociative or avoidance symptoms. Collateral obtained from his parents confirmed no previous diagnosis of a primary mood or thought disorder; however, he did have a history of extensive cannabis and alcohol misuse. Furthermore, the patient's father had a diagnosis of bipolar I disorder and benzodiazepine dependence. Organic work-up, including CT scan of the brain, were all within normal limits. There were no abnormal physical findings. The patient's mental status examination revealed increased psychomotor activity, pressured speech, euphoric and expansive affect, tangential thoughts with loose associations, and delusions of grandeur.

During the first 3 days of admission, he was difficult to redirect and required emergency medications of olanzapine (10 mg by mouth) and lorazapam (2 mg by mouth) on three different occasions. Over the next 4 days, he became agreeable to scheduled olanzapine (10 mg twice a day) and lorazapam (2 mg by mouth at bedtime). He exhibited improvement, with reduced manic symptoms, including improved sleep (8 hours nightly), increased mood stability, and decreased agitation and irritability. On day 7 of his hospitalization, the patient no longer met involuntary hospitalization criteria and requested to be discharged. Although he continued to exhibit rapid speech and expansive affect at discharge, he regained insight and was able to reflect on his recent behavior as being "out of character."

Discussion

This case demonstrates the importance of understanding the unique role that military psychiatrists play in the treatment of active-duty service members in the unnatural environment of a war zone. Not only must active-duty psychiatrists have an immediate understanding of emergency psychiatry, gene-environment interactions, and pharmacologic interactions, they must also have knowledge of how deployment stress influences all of the aforementioned variables. The concept of the biopsychosocial model is highly relevant to the above case. The patient had a history significant for presumed abuse of both alcohol and cannabis, thus making him more at risk for a potential psychotic experience (4). His acute and recent environmental contributions included his exposure to combat, recent explosive trauma, poor sleep, removal of primary support, a deployed environment, and limited mental health care resources. The various stressors that the patient experienced both in the past and recently likely interacted with his probable genetic loading for a primary mood disorder, thus resulting in psychotic presentation (5).

Secondly, ketamine and dexromethorphan were also important variables in this case. Ketamine has gained attention in the literature because it has demonstrated mood-elevating effects and rapid antidepressant properties (4). In fact, the psychotropic tendencies of ketamine are so prominent that it is proposed to induce schizophrenia and manic-like states in animal models (6). It is postulated that noncompetitive *N*-methyl-D-aspartate (NMDA) receptor antagonism and sigma-1 opiate receptor agonism play a role in mediating ketamine's mood-elevating effects (7). Because it is common practice to screen for manic symptoms before starting a patient on antidepressants to prevent mania induction, it is conceivable that the rapid antidepressant properties of ketamine contributed to our patient's acute presentation. Similarly, dexromethorphan also has psychotomimetic properties. In fact, high-dose dexromethorphan has been described to have effects similar to those of ketamine and other recreational drugs, such as phencyclidine (8). The patient's motivation to use dexromethorphan was to achieve a "high" feeling given his limited access to other forms of intoxication. Pharmacologically, this over-the-counter medication shares many properties with ketamine, including NMDA antagonism and sigma-1 agonism (9). It is likely that the high dexromethorphan dosage consumed by the patient contributed to his manic symptoms similar to the mechanisms that underlie ketamine's rapid antidepressant properties.

As demonstrated, ketamine and dexromethorphan individually played roles in this presentation. Furthermore, the effect of these two medications in combination as well as the addition of haloperidol brings up the importance of pharmacologic interactions. Although ketamine and haloperidol were administered intravenously, thus bypassing initial hepatic metabolism, both have metabolites. These metabolites are likely processed hepatically, and thus the 2D6 pathway may have been overburdened in our patient. Because of the pharmacological similarities between ketamine and dexromethorphan, the effects resulting from the combination may have reacted synergistically. However, this would need to be elucidated at the molecular and clinical levels to further account for our patient's presentation.

Conclusions

This case demonstrates the unique variables that military psychiatry is tasked to account for in austere settings. The contribution of dexromethorphan and ketamine, in addition to the genetic and environmental factors at play, represent the multifactorial presentation of this patient. Furthermore, with the increasing use of ketamine in various treatment modalities for mood disorders, anesthesia, and pain management, as well as the ease of accessibility of dexromethorphan, it is important to remain vigilant of the various consequences these drugs can mediate. This case represents the importance of a holistic approach that appreciates complex biological, psychological, and social factors in order to aid in optimal diagnosis and treatment. Military psychiatry is often offered the challenge of deciphering such complex variables.

Dr. Liu is a first-year resident, and Dr. Burson is a fourth-year resident at the University of Texas Health Science Center San Antonio-Lackland Air Force Base Joint Psychiatry Residency Program. Dr. Burson is also an active-duty Captain in the United States Air Force.

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Virtual Reality Exposure Therapy for the Treatment of Combat Posttraumatic Stress Disorder

Ryan Richmond, B.S.

The United States has been involved in multiple wars for over a decade. This has resulted in more than 2 million servicemen and women who have been subject to long multiple and harsh deployments (1).War-related mental illnesses are not commonly seen by most civilian mental health care providers. This makes disorders such as combat posttraumatic stress disorder (PTSD) difficult to treat except for in an extremely individualized manner. Additionally, treatment is complicated by the large numbers of people affected by war-related mental illnesses. Between 4% and 45% of U.S. troops deployed to Iraq and Afghanistan have met criteria for PTSD-related disorders, and treatments such as exposure therapy, which includes virtual reality exposure therapy (VRET), have been shown to have one of the best therapeutic efficacies (1, 2).

The purpose of this article is to provide an overview and exploration of VRET and its relation to combat-related PTSD and how it compares to previously established traditional therapy, as well as where this technology is going today and why knowledge of the therapy is important for civilian and military physicians alike.

What Is VRET?

First documented in 1994 in a case study of a single Vietnam veteran suffering from PTSD, exposure therapy has been used to treat survivors of various traumas, including automobile accidents and the September 11, 2001, terrorist attacks. Exposure therapy has also been used for treatment of severe phobias and anxiety disorders (3, 4). This form of therapy was developed under the assumption that confrontation with the feared stimulus would desensitize the patient to the stimulus, resulting in reduction in anxiety symptoms. Exposure therapy includes behavioral modification techniques, such as those used in cognitive-behavioral therapy (CBT), and may involve confronting anxiety-provoking situations in everyday life (in vivo exposure). Exposure therapy also involves imaginal exposure, a technique in which the patient relives and talks through traumatic events (5). There are some limitations in traditional exposure therapy. For example, some patients are not able to complete the therapy, reporting problems with willingness and ability to engage in the imaginal exposure. One strategy in VRET is to circumvent this obstacle by providing a more realistic experience, for example, detailing simulated convoys, dismounted patrols, attacks and ambushes, small-arms fire, rocket fire, and human remains (3, 6). Newer technology has moved virtual therapy to a realistic therapy modality (2).

VRET can be conducted in many different ways, and most trials include therapy involving an average of 10 sessions lasting between 90 and 120 minutes. During the session, the patient is placed in the simulator. Some simulators have the capacity to produce only virtual images, while others can add auditory and olfactory stimuli. The most common equipment includes movement that is controlled with a joystick, allowing the patient to interact in a virtual reality environment simulating his or her specific trauma (6). The graphics have been described as being "similar to what might be experienced in a high-quality, modern videogame" (5). The sessions are facilitated by a therapist who works with the patient, guiding him or her through the environment and controlling the amount of exposure received. Interestingly, there have been recent advances in and additions to the VRET platform. For example, virtual reality-graded exposure therapy has been introduced and involves psychophysical measurements, such as skin conductance, finger temperature, respiration rate, and heart rate. Each therapy trial ultimately focuses on addressing the four primary symptoms of PTSD (including combat-related PTSD): avoidance, re-experiencing, hyperarousal, and the presence of trauma.

Does VRET Work?

The PTSD Checklist–Military version has been used to evaluate patients for diagnosis of PTSD (1, 6–8). This checklist is a widely accepted method of categorizing PTSD symptoms (6). Other clinician-rated and self-reported measures that have been used include the Clinician-Administered PTSD Scale, the Mini International Neuropsychiatric Interview, the Patient Health Questionnaire–9, the Beck Anxiety Inventory, the Combat Exposure Scale, and the Blast Assessment (7). These clinical instruments are used to analyze how patients with depression and anxiety disorders respond to various modalities of treatment.

In a recent open-label, single-group study, McLay et al. (8) aimed to develop and test a method for applying VRET, using the PTSD Checklist–Military version, the Patient Health Questionnaire–9, and the Beck Anxiety Inventory as outcome measures. The authors reported statistically significant results, with an average reduction in PTSD symptom scores by 50%, depression scores by 47%, and anxiety scores by 36% (8). In addition, these results were maintained 3 months after the completion of VRET treatment. The data were analyzed using last-observation-carried forward and intention-to-treat analyses. These results are consistent with prior studies, which also demonstrated the efficacy of VRET in combat PTSD (4, 6).

In an earlier randomized, unblinded study, McLay et al. (5) reported that seven out of 10 patients showed a 30% reduction ($p<0.05$) in symptoms after receiving virtual reality-graded exposure

therapy, compared with one out of 9 patients who received normal standard of care ($p<0.001$) (5). These results are similar to those found in studies of traditional VRET techniques (6, 8). However, the study was limited due to its small sample size and wide variability in the patients' response to treatment. In a case report, Wood et al. (7) reported similar results for a patient receiving virtual reality-graded exposure therapy, with the patient's score on the PTSD Checklist–Military version indicating a decrease in symptoms (baseline score, 55; follow-up score, 45). This same patient did not exhibit any notable changes in depressive or anxious symptoms as indicated by scores on the Patient Health Questionnaire–9 and Beck Anxiety Inventory. However, there was no mention of any statistical analysis in this case.

What Does the Future Hold?

Currently, there are many modalities for treating combat-related PTSD, including traditional CBT, exposure therapy, prolonged exposure, and VRET. At the present time, however, VRET has not been shown to be superior to other modalities such as CBT, eye movement desensitization, and reprocessing and relaxation therapy (8), and this hinders its use in large population cohorts. While there is a meta-analysis examining VRET for the treatment of anxiety disorders and phobias, there is no meta-analysis examining VRET in the treatment of combat-related PTSD (3). Additionally, most of the investigations conducted to date consist of small sample sizes, are often not blinded, are not randomized, and do not include a comparison group. Despite these factors, VRET and virtual reality-graded exposure therapy appear to be promising, and, if properly developed, could be an efficacious means of treating combat-related PTSD.

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Effects of Military Deployment on Children

Nicole Garber, M.D.

Since the September 2001 terrorist attacks, there have been over 2 million U.S. troops deployed in Operations Enduring Freedom and Iraqi Freedom (1), and more than 900,000 troops with children have been deployed (2). We know that deployment can affect the service member, with known complications being posttraumatic stress disorder, depression, substance abuse, and traumatic brain injury, but less has been known about the impact of deployment on children in military families.

Cycle of Deployment

In 1987, Kathleen Logan (3) postulated the "emotional cycle of deployment," which initially examined the effects of deployment on military wives only. More recently, this concept has been adapted to examine how the cycle of deployment affects military families. Logan identified five stages in the cycle of deployment: predeployment, deployment, sustainment, redeployment, and postdeployment. The predeployment stage is marked by anticipation of the loss of the loved one and denial of the situation. This tends to be a busy time for family members as they try to prepare for the impending departure. Parents may be distracted during this phase, and this may lead children to wonder whether their parents will be able to take care of them. Children may also wonder whether the deployed parent will return home. The deployment period is often marked with worry by the nondeployed spouse. Younger children may have stronger emotions, cry, regress, complain of body aches, and have irritable and sad moods, and teenagers may isolate themselves or engage in risky activities, such as drug and alcohol abuse. Sustainment is typically the period in which the family adjusts to the deployment and feels empowered that they can cope adequately with the challenges. The redeployment phase is the period of time about a month before the solider returns home; it is often marked with excitement, anticipation, and stress over preparing for the return. The postdeployment phase is often a period of transition for the family, a period marked by joy but also a need to renegotiate the family life and roles. This can be a particularly challenging time for children of all ages. Children less than 1 year old may not remember the parent and may cry when held by the returning parent. Toddlers may be apprehensive initially around the returning parent, and preschoolers may feel guilty about the separation. School-age children may seek and desire a lot of attention from the parent, and adolescents may act as though the return of the parent is not a big deal. Other research has specifically focused on the deployment and postdeployment phases (4).

Child Maltreatment

One study used the Central Army Registry database to examine the rate of child maltreatment in Army families in which a parent was deployed compared with the rate in which no parent was deployed. The study found that the rate of child maltreatment was 42% higher when a family member was deployed compared with when no family member was deployed. The study also examined different forms of abuse to determine whether there were patterns between different types of abuse and deployment status. Rates of neglect were almost twice as high in families with a deployed member compared with families in which no one was deployed. Abuse was more likely to be committed by the female civilian in families with a deployed family member. One possible reason for this may be that most of the at-home caregivers were women, and most of the deployed family members were men. Male and female children were equally likely to be abused during deployments, but children between 2 and 5 years old were most at risk (5).

Emotional and Behavioral Adjustments

Chandra et al. (6) collected information from families that attended a camp called Operation Purple, a free camp for military-dependent children ages 7 to 17 years old to help them deal with the stress of having a parent deployed. A total of 1,507 families participated in a computer-assisted telephone interview with the children and their nondeployed parent. The study examined child wellness, which included academic performance, peer and family relationships, general emotional difficulties, and problem behaviors. Chandra et al. compared answers from this survey with data from the 2001 National Health Interview Survey, which provided population norms. The study found statistically significant higher scores, indicating higher levels of distress, for all measures among children in Operation Purple compared with scores for their age- and gender-matched peers in the general population. The study revealed some associations based on age; for example, peer relationships improved with increasing age, and anxiety symptoms decreased with increasing age. Some behaviors and functioning worsened with increasing age, such as fighting, drinking, and academic engagement. There was also an association between self-reported caregiver mental health and the child's academic engagement and relationship strengths. The study also examined the postdeployment period and found that older children had more difficulties with reintegration. A possible explanation for this, as proposed by the investigators, may be that older children are likely to take on more responsibilities while the deployed parent is away and therefore may experience greater role transitions when the parent returns.

Chartrand et al. (7) examined 169 families with children ages 18 months to 5 years old who attended daycare on a Ma-

rine Corps base. They divided the families into two groups: those with a deployed parent and those without a deployed parent. The Child Behavior Checklist–parent and teacher report was used to evaluate children, and the Parenting Stress Index–short form and Center for Epidemiological Studies Depression Scale were used to evaluate caregivers. At this particular base, the mean time of deployment was 3.9 months. Children 3 to 5 years old had higher total scores as well as higher scores for externalizing behaviors (such as tantrums) on the Child Behavior Checklist parent report form and higher scores for externalizing behaviors on the teacher report form. No such correlation was found for children 18 months to 3 years old. This suggests that older children respond differently from younger children to the deployment of a parent. The authors hypothesized that this may be because in most cases the deployed parent was the father and that often the primary attachment of the child is to the mother. Therefore, the youngest children in the study may have been protected by the secure attachment with their mothers, and that during their fathers' deployment they were actually able to spend more time with the preferred attachment figure.

A total of 171 Army and Marine families participated in a study examining anxiety in children with a deployed parent (8). The families included 163 nondeployed parents, 65 parents who were currently deployed or who had recently returned from deployment, and 272 children. The average length of deployment for the Army and Marine families was 12 months and 7 months, respectively. The Child Behavior Checklist, Children's Depression Inventory, and Multidimensional Anxiety Scale for Children were used to measure outcomes in children, and the Brief Symptom Inventory, Posttraumatic Diagnostic Scale, and Posttraumatic Stress Disorder Checklist–Military version were used to measure outcomes in parents. On the Multidimensional Anxiety Scale for Children, those with a currently deployed parent had increased ratings, indicating higher levels of distress (mean boys score, 56.21; mean girls score, 53.62), compared with community norms (mean boys score, 42.06; mean girls score, 49.12). Children with a recently returned parent also had increased ratings (mean boys score, 56.18; mean girls score, 54.79). The increased ratings were primarily for separation anxiety and physical manifestations of anxiety. The study found that 31.9% of children with a recently returned parent and 24.7% with a currently deployed parent had clinically significant anxiety symptoms. The two groups did not have elevated scores for the other measures compared with community norms. With regard to sex differences, girls were found to be at higher risk for externalizing behaviors while a parent was deployed, compared with community norms, but had ratings similar to those found in the community when the parent was recently returned. Boys exhibited the opposite pattern, with increased externalizing behaviors when the parent was recently returned.

Conclusions

This study can help guide possible interventions that may help increase resiliency among military families. The studies discussed reveal that children with a deployed parent are more likely to experience child maltreatment, receive more outpatient services, and have behavioral maladjustments. The studies also reveal that certain populations are more vulnerable, particularly children ages 3 to 5 years old, when a parent is deployed and that there may need to be continued services for families after deployment. There are several resources that exist to prepare children for the different phases of deployment (www.realwarriors.net and www.myarmyonesource.com). Such resources can help children and families better cope with the stresses of deployment.

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Editor's Note:

We would like to acknowledge Harita Raja, M.D., for her contribution to the *Residents' Journal* as Guest Section Editor for the March 2013 issue.

TEST YOUR KNOWLEDGE

In preparation for the PRITE and ABPN Board examinations, test your knowledge with the following questions.
(answers will appear in the next issue)

In preparation for the PRITE and ABPN Board examinations, test your knowledge with the following questions (answers will appear in the next issue). This month's questions are courtesy of Venkata B. Kolli, M.D., a third-year resident at the Nebraska Medical Center, Omaha, Nebraska.

Question 1.
A 25-year-old male patient with paranoid schizophrenia presents with another relapse following a long history of noncompliance with oral antipsychotic agents. With the intention of transitioning the patient to depot haloperidol decanoate, oral haloperidol was initiated. The patient tolerates the oral haloperidol well. What is the utility of an intramuscular test dose administration?

A. Test for extrapyramidal side effects
B. Test for sensitivity reactions
C. Test the degree of psychological resistance
D. Test dosing does not have any advantages

Question 2.
The patient in question #1 is started on haloperidol decanoate (100 mg, intramuscular, 4 weekly doses). When should the depot dose be evaluated following the first dose administration?

A. At 1 week
B. At 2 weeks
C. At 4 weeks
D. At 6 weeks

ANSWERS TO MARCH QUESTIONS

Question #1.
Answer: D. Moclobemide

Moclobemide is a reversible inhibitor of monoamine oxidase type A (MAO-A) (1). Tranylcypromine is a nonhydrazine irreversible MAOI. It increases the concentration of norepinephrine, epinephrine, and 5-HT in the CNS. It also has a mild stimulant effect. Isocarboxazid is an irreversible hydrazine MAOI. Phenelzine is a substrate as well as an irreversible MAOI.

Reference

1. Schatzberg A: Monoamine oxidase inhibitors, in The American Psychiatric Publishing Textbook of Psychopharmacology, 4th ed. Washington, DC, American Psychiatric Publishing, 2009

Question #2.
Answer A. Tranylcypromine

MAO inhibitors not only inhibit MAO, but may also block MAO uptake. Tranylcypromine is believed to have the most potent blockade of MAO uptake (1). Isocarboxazid, phenelzine, and selegiline may have MAO uptake blockade but to a lesser extent than tranylcypromine (1).

Reference

1. Schatzberg A: Monoamine oxidase inhibitors, in The American Psychiatric Publishing Textbook of Psychopharmacology, 4th ed. Washington, DC, American Psychiatric Publishing, 2009

We are currently seeking residents who are interested in submitting Board-style questions to appear in the Test Your Knowledge feature. Selected residents will receive acknowledgment in the issue in which their questions are featured.
Submissions should include the following:
1. Two to three Board review-style questions with four to five answer choices.
2. Answers should be complete and include detailed explanations with references from pertinent peer-reviewed journals, textbooks, or reference manuals.
***Please direct all inquiries and submissions to Dr. Vahabzadeh: arshya.vahabzadeh@emory.edu.**

Author Information for *The Residents' Journal* Submissions

The Residents' Journal accepts manuscripts authored by medical students, resident physicians, and fellows; manuscripts authored by members of faculty cannot be accepted. To submit a manuscript, please visit http://mc.manuscriptcentral.com/appi-ajp, and select "Residents" in the manuscript type field.

1. **Commentary:** Generally includes descriptions of recent events, opinion pieces, or narratives. Limited to 500 words and five references.
2. **Treatment in Psychiatry:** This article type begins with a brief, common clinical vignette and involves a description of the evaluation and management of a clinical scenario that house officers frequently encounter. This article type should also include 2-4 multiple choice questions based on the article's content. Limited to 1,500 words, 15 references, and one figure.
3. **Clinical Case Conference:** A presentation and discussion of an unusual clinical event. Limited to 1,250 words, 10 references, and one figure.
4. **Original Research:** Reports of novel observations and research. Limited to 1,250 words, 10 references, and two figures.
5. **Review Article:** A clinically relevant review focused on educating the resident physician. Limited to 1,500 words, 20 references, and one figure.
6. **Letters to the Editor:** Limited to 250 words (including 3 references) and three authors. Comments on articles published in *The Residents' Journal* will be considered for publication if received within 1 month of publication of the original article.
7. **Book Review:** Limited to 500 words and 3 references.

Abstracts: Articles should not include an abstract.

Upcoming Issue Themes

Please note that we will consider articles outside of the theme.

June 2013

Section Theme: Psychiatry and Social Justice
Guest Section Editor: Megan Testa, M.D.
Megan.testa@mh.ohio.gov

July 2013

Section Theme: Open
E-mail Editor: Arshya Vahabzadeh, M.D.
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August 2013

David Hsu, M.D.
Section Theme: Geriatric Psychiatry
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September 2013

Section Theme: Open
E-mail Editor: Arshya Vahabzadeh, M.D.
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October 2013

Section Theme: Global Psychiatry
Misty Richards, M.D., M.S.
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