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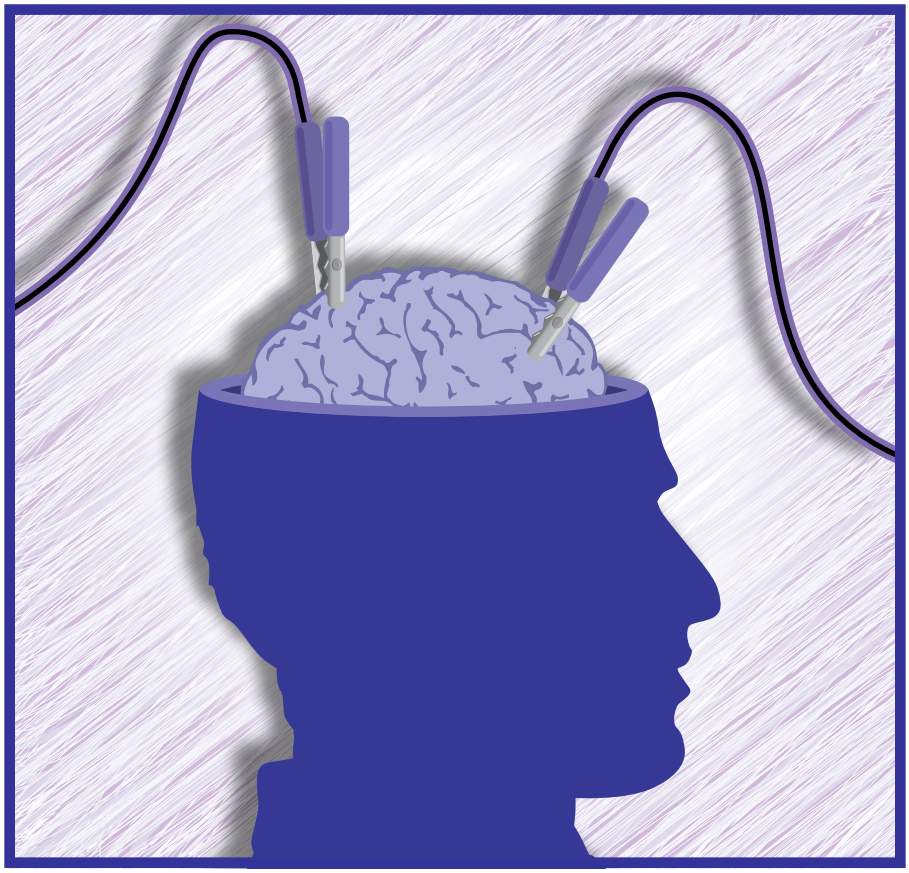

This issue of *The Residents' Journal* features articles in the area of interventional psychiatry. The section begins with a commentary by Adam Philip Stern, M.D., who provides background information pertaining to the definition and use of interventional psychiatry as well as mechanisms and procedures. Jaya Padmanabhan, M.D., and Anthony Marfeo, M.D., discuss the use of deep brain stimulation for treatment-resistant depression. John McNeil, M.D., outlines important issues surrounding anesthetic management during ECT. The section concludes with an article by Arshya Vahabzadeh, M.D., who offers valuable information regarding the term interventional psychiatry as well as its implications in the field of psychiatry.

Editorial

Recent and Possible New Changes in Graduate Medical Education

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Editor-in-Chief

Residency training has undergone significant changes in the past decade. This part of medical training is known as being a time-consuming and somewhat grueling process, during which one further develops his or her knowledge and skills in preparation for independent practice. Just this past July, the American College of Graduate Medical Education made significant changes to resident duty hours (1). These changes had a direct effect on first-year residents as well as indirect effects on more senior residents and were implemented due to a reported link between medical errors and fatigue (2). *The Residents' Journal* will be publishing a Point-Counterpoint section in the next few months detailing opposing resident viewpoints on these recent duty-hour changes, and we look forward to receiving your feedback.

In addition to changes made by the American College of Graduate Medical Education, there is a possibility that graduate medical education will be further affected by the newly created congressional supercommittee. This committee was formed in an effort to reduce the federal deficit. The committee members have indicated that there could be a reduction in the deficit of more than 60 billion dollars in the next decade through reduction in and consolidation of graduate medical education payments (3). The potential effects of this on graduate medical education are significant and have garnered attention from the American Psychiatric Association, which recently sent a letter to the supercommittee stating that they "are gravely concerned that reductions in Medicare's support for GME potentially worsen an already problematic national physician workforce shortage" (4). This issue highlights the importance of residents staying involved in and up-to-date on government affairs throughout their medical training and careers. *The Residents' Journal* welcomes submissions regarding this topic and encourages residents to stay abreast of developments in this area.

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Commentary

Interventional Psychiatry

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Interventional psychiatry can be defined as the use of medical devices and procedures in the treatment of mental illness. It is a subspecialized field within psychiatry that is becoming increasingly relevant in its contributions toward mental health care. Interventional psychiatry provides several unique approaches to treatment that may enable distinct therapeutic advantages not accessible through other treatment modalities.

As more knowledge about brain and neuronal functioning has been accrued in recent years, the field of psychiatry has adapted by incorporating treatment modalities that feature increasingly neurobiological approaches toward altering brain function. Broadly altering neurotransmitters and their receptors, however, is an imperfect and nonspecific intervention on a system that evidently features complex functional connectivity networks specifically correlating with different psychopathologies. Interventional psychiatry carries a vast potential to directly modulate these networks in a more focused manner through the use of medical devices that stimulate or inhibit specific brain and nervous system areas, with more targeted applications than what is achievable with current psychopharmacologic options.

Psychiatry bears the scars of a checkered past involving, among other interventions, the use of prefrontal ablations and lobotomies in the treatment of severe mental illness, and some societal and professional reluctance is to be expected. With the array of ethical questions considered alongside the growing potential benefits of new interventional treatments, societal reservations should diminish in the coming decades as safety and responsible use are demonstrated over time.

ECT has been used for decades in the treatment of severe mental illness and remains a highly effective tool for treating a number of major mental illnesses often resistant to other approaches. Additionally, a number of strides have been made in making the procedure physically and emotionally tolerable for patients. Still, the benefits of ECT are paired with the burdens of high cost, lengthy time of care, use of anesthetics, and notable side effects, such as short-term memory loss (1).

There is a current need and opportunity for other procedural interventions to contribute to psychiatric treatment. It is essential to thoroughly investigate these novel technologies and methodologies that may lead to more focused, more effective, and less invasive treatments. Treatment modalities that have shown clinical promise and warrant further investigation include repetitive transcranial magnetic stimulation (2), deep brain stimulation (3), vagus nerve stimulation (4), and transcranial direct current stimulation (5). Each of these interventions, through different mechanisms, attempts to affect mood and brain function through the use of neuronal stimulation applied to specific functional connectivity networks. While the exact mechanism by which ECT produces clinically beneficial results remains shrouded in uncertainty, it is clear that manipulating brain activity, whether it be through the induction of generalized seizure activity, as in the case of ECT (1), or through the utilization of noninvasive electrical currents to induce cortically stimulating magnetic fields, in the case of repetitive transcranial magnetic stimulation (2), can affect mood and higher-level functioning and therefore can be clinically useful.

Psychiatry must use the entire palette available in order to achieve its full potential in the diagnosis and treatment of mental illness. Interventional psychiatry should play an increasingly meaningful role alongside psychopharmacology and psychotherapy in the coming years.

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Deep Brain Stimulation for Treatment-Resistant Depression

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Initially pioneered as a treatment for neurological disorders, including Parkinson's disease and dystonia, deep brain stimulation is showing promise in the alleviation of severe psychiatric illness. Deep brain stimulation has been approved by the Food and Drug Administration for treatment-resistant cases of obsessive-compulsive disorder (OCD) (1). Most recently, research on deep brain stimulation has expanded into the realm of treatment-resistant depression. The operational definition of treatment-resistance varies but generally includes lack of remission following adequate trials of antidepressants from multiple classes and often following ECT (2). The present article will provide a review of the mechanisms of action of deep brain stimulation in treatment-resistant depression, major clinical trials, risks and adverse effects, and future directions.

Mechanisms of Action

Surgery for depression has been used occasionally for decades. The general principle has been to use physical, chemical, or thermal means or radiation energy to destroy a specific area of the brain in order to alleviate depression. The regions targeted usually have included white matter tracts between the prefrontal cortex and subcortical nuclei. These locations are discussed in detail elsewhere (3), but they have been considered, along with functional imaging, in selecting sites for deep brain stimulation.

Deep brain stimulation involves a procedure in which a surgeon drills a small hole in the skull and permanently inserts one or more thin, flexible, multipolar electrodes under stereotactic guidance. A small power source is placed in the chest subcutaneously, much like a pacemaker. Modifications to stimulation characteristics can be done via magnets placed on the skin over the device.

Deep brain stimulation can be applied to brain structures that would previously have been either directly destroyed or indirectly muted by destruction of connected structures. Generally, high-frequency stimulation with deep brain stimulation electrodes mimics the effects of neuron cell-body destruction (4, 5). The effects are more complex than a destructive lesion, however, and nearby neurons can also undergo an increase in action potentials if the axonal body is stimulated (6). The level of stimulation decreases as a function of distance, but the intervening tissue affects the efficiency of transmission. Each probe has multiple contacts, and thus the stimulation parameters can be adjusted to change the shape, direction, and strength of the field. To complicate matters further, these are only short-term effects; neurons are quite plastic, and thus long-term adaptation occurs. This makes empirical research on deep brain stimulation essential to understanding its effectiveness.

Trials in Treatment-Resistant Depression

Because deep brain stimulation in the treatment of depression is currently limited to small-scale studies, there are no universal clinical criteria for its use. Because of its experimental status and invasiveness, the procedure has generally been reserved for patients with severe, chronic (longer than 5 years) depression who have not remitted following multiple medication trials and psychotherapy (7, 8). Most recipients have also not remitted following ECT, but this is not a strict requirement. Studies generally exclude comorbid neurological, medical, and psychiatric illness, particularly psychotic disorders and cluster B personality disorders (7, 8). However, these exclusions reflect the experimental nature of the therapy rather than evidence that deep brain stimulation would be unsafe or ineffective in these situations.

Thus far, several anatomical targets appear to be efficacious in the use of deep brain stimulation for treatment-resistant depression. One target is the subgenual cingulate region (Brodmann's area 25). Functional neuroimaging studies have shown increased activity in this region in depressed patients, and medications and ECT appear to mitigate this overactivity (7). Mayberg et al. (9) demonstrated the efficacy of sustained bilateral deep brain stimulation to this region in patients with treatment-resistant depression. Treatment resistance was defined as a lack of response to at least four different antidepressant treatments, but a trial of ECT was not required. Devices were implanted under local anesthesia, and voltage was adjusted in a postoperative test session, allowing patients to self-report subjective effects of various stimulation levels. As soon as the device was turned on, patients reported effects such as "sudden calmness" or "disappearance of the void." Over several weeks, patients reported improved interest and pleasure in everyday activities as well as increased ability to complete tasks. At 6 months, four out of six patients showed a clinical response, which was defined as a greater than 50% reduction in the Hamilton Depression Rating Scale (HAM-D) score. Serial positron emission tomography scans showed above-normal blood flow to Brodmann's area 25 before treatment and decreases in blood flow to this area after 3 months of stimulation.

A recent follow-up study conducted by Kennedy et al. (10) reported on outcomes 3 to 6 years after initiation of deep brain stimulation in an expanded group of 20 patients (which included the six original patients from the Mayberg et al. study). Once again, the patients had not remitted following at least four antidepressant treatments, not necessarily including ECT. Following deep brain stimulation, 62.5% of patients experienced a greater

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than 50% reduction in their HAM-D score after 1 year, and 64.3% had done so by the last follow-up visit (mean follow-up of 42 months). Remission, defined as a HAM-D score <7, was seen in 18.8% of patients after 1 year and in 42.9% at the last follow-up visit. Measures of social function improved, including employment rates, which increased from 10% to 50% within 1 year.

The ventral internal capsule/ventral striatum is another promising target of deep brain stimulation for treatment-resistant depression. This region was selected because of its signs of promise in deep brain stimulation for OCD as well as neuroimaging research indicating its involvement in reward-seeking behavior, which is a core deficit in depression (8, 11). In a study conducted by Malone et al. (8), 15 patients received bilateral deep brain stimulation to the ventral internal capsule/ventral striatum. Treatment resistance was defined as a lack of remission following at least three classes of antidepressants, an augmented antidepressant regimen, 20 sessions of psychotherapy, and a six-session trial of ECT. Results showed a 6-month response rate of 47%, as defined by a greater than 50% decrease in Montgomery-Åsberg Depression Rating Scale scores, and a 6-month remission rate of 27%, defined as a Montgomery-Åsberg Depression Rating Scale score <10 (8).

A third set of studies has shown effectiveness with deep brain stimulation to the nucleus accumbens, which is the part of the ventral striatum involved in pleasurable experiences and reward-seeking behavior (11). As reported by Schlaepfer et al. (11), deep brain stimulation of this location alleviated anhedonia, a core symptom of depression, in three patients with refractory depression. Similar to the Malone study, inclusion criteria required lack of remission following ECT, multiple antidepressant regimens, and psychotherapy. Interestingly, within moments of turning on the device for the first time, one patient expressed a desire to go bowling, and another reported an intention to visit a famous cathedral in town, revealing a rekindling of motivational behavior.

A subsequent follow-up report on 10 patients found that five had experienced a clinical response by the end of 12 months (as defined by a greater than 50% reduction in the HAM-D score) (12).

Lastly, a recent case report found that deep brain stimulation of the lateral habenula induced remission of depression in a 64-year-old female patient who had been resistant to ECT and pharmacotherapy for 9 years. The lateral habenula is hypothesized to alter neurotransmitter activity through its effects on the midbrain (13).

Adverse Effects

The surgical risks of deep brain stimulation have been well established in movement disorders, and it is reasonable to expect similar results for treatment-resistant depression. Stimulation itself has been found to cause side effects, including paresthesias, gait ataxia, and dyskinesia (14). Autopsy and animal studies have shown scar tissue formation, and electrodes that were removed for clinical reasons have resulted in immune reaction and tissue adherence. These reactions are microscopic, but they suggest that the effects of implantation are not completely reversible, even though electrodes can be turned off (15).

A series of 319 patients underwent electrode implantation for movement disorders, including Parkinson's disease, essential tremor, and dystonia, and were followed over 10 years (16). The rate of perioperative and intraoperative hemorrhage was low, with only four patients experiencing these serious events. Long-term surgical complications were also low, with a 4.4% infection rate and revisions needed in 7.8% of patients (16). This was one of the largest studies of electrode implantation safety, and other series have shown similar results (17). Suicide rates postprocedure were noted to be elevated in this particular population of movement-disordered patients (0.16%–0.32% over an average of 2.4 years). In a three-institution study of 15 patients with electrodes placed in the ventral capsule/ventral striatum for depressive episodes, four (27%) were noted to have increased depressive symptoms due to battery depletion, and three (20%) were found to have accidental deactivation of their units (8). No increases in suicidal thoughts or behaviors were noted in this small study, and hypomania was observed twice in the same bipolar patient (8). Current technology requires surgeries to replace batteries every few years, although rechargeable units are being developed. These adverse effects form part of the risk-benefit discussion each patient and doctor must have.

Future Developments

Although studies thus far merit cautious enthusiasm, the efficacy of deep brain stimulation needs to be established with larger scale, double-blinded trials. Future investigation will need to optimize neuroanatomical targets and stimulation parameters. Patient safety and adverse effects should remain important concerns, and technological improvements will help in this regard. Ultimately, there may be potential for the development of "closed-loop" deep brain stimulation devices that self-adjust stimulation settings in response to feedback on the brain's electrical and chemical activity (1). Given its early successes, deep brain stimulation may become a meaningful tool in the treatment of some severe psychiatric illnesses.

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Anesthetic Management During Electroconvulsive Therapy

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Anesthesia and psychiatry regularly collaborate in the delivery of ECT, and it is important for psychiatrists to gain a clinical understanding of the anesthetic considerations involved in this procedure. Although ECT is a relatively safe and low-risk intervention (1), anesthesiologists approach it as they would any procedure involving general anesthesia as well as the potential for life-threatening airway, cardiac, or pulmonary complications. Some guidelines suggest that patients should not be taking any psychotropic drugs before undergoing ECT (2). In clinical practice, the patient is rarely required to discontinue all psychotropic treatment, but it is important for the anesthesiologist to be aware of these medications because many have the potential for significant drug interactions or undesired side effects during ECT. For example, the anticholinergic properties of tricyclic antidepressants can worsen the sympathetic response to seizure.

The objective of the administration of anesthesia during ECT are: 1) to induce general anesthesia and render the patient unconscious before 2) paralyzing the patient to prevent skeletal muscle injury while seizing; both are done while 3) vital signs are monitored and oxygenation and ventilation are provided.

Preprocedural Concerns

Patients should not consume anything by mouth after midnight on the day of their procedure. Unlike many patients undergoing surgery, premedication with a short-acting benzodiazepine, such as midazolam, is counterproductive because it will raise the seizure threshold. Intravenous access is obtained prior to the psychiatrist seeing the patient. Standard monitoring includes blood pressure measurement, pulse oximetry, three or five ECG leads, and continuous end-tidal carbon-dioxide observation (3). Although intubation is rarely required, the anesthesiologist should have all of the usual emergency medication and airway equipment close at hand.

Induction of Anesthesia

Induction of anesthesia is done intravenously, most commonly with methohexital, a short-acting barbiturate (4). Propofol may return a patient to his or her baseline mental status (postprocedure) more rapidly, but it shortens the seizure duration more than methohexital. Etomidate produces significantly less myocardial depression than propofol or barbiturates but causes higher incidence of postprocedure nausea and vomiting. Since most induction drugs are gamma-aminobutyric acid-ergic and raise the seizure threshold, some practitioners include a short-acting narcotic, such as remifentanil, which does not affect seizure threshold and permits a lower dose of the induction agent. Inhaled agents are not routinely used for ECT, given the short duration of the procedure and the fact that it is often performed in areas of the hospital where there is no waste gas scavenging. The anesthesiologist must work closely with the psychiatrist to select the best medication, dosage, and timing of drug administration for each individual patient in order to achieve the desired seizure duration in the safest manner.

Hyperventilation

Once general anesthesia has been induced, the anesthesiologist will begin to hyperventilate the patient, usually with a bag valve mask (Ambu bag). Hyperventilation is performed because hypocapnia can lower the seizure threshold (3). In the rare case that the patient cannot be adequately ventilated after administration of the induction drug, airway devices, such as an oral or nasal airway, a laryngeal mask airway, or an endotracheal tube, can be used to assure adequate ventilation. Such a patient may become easier to ventilate after a neuromuscular blocking (paralytic) drug is administered. However, the decision to paralyze cannot be made lightly, since the consequence may be death if it is not possible to ventilate once diaphragmatic function stops. Cancellation and rescheduling in an operating room setting should be considered when a patient with suspected (based on the airway examination) or known difficult intubation history is scheduled for ECT.

Neuromuscular Blocking Agents

Prior to the administration of the neuromuscular blocking agent, a tourniquet is placed tightly around one ankle. Consequently, the foot below the tourniquet will not be paralyzed in order to allow the psychiatrist to monitor seizure activity. Additionally, a patient who has been paralyzed but is not completely anesthetized will be able to move his or her toes on that foot upon command, thus alerting the anesthesiologist that more sedation needs to be given. Alternatively, an electromyogram can be used.

The next step is paralysis, which is nearly always achieved using succinylcholine, a depolarizing neuromuscular blocker (4). Succinycholine is preferred because it is the shortest-acting of all the neuromuscular blockers, but it does have several side effects and may be contraindicated in some patients (3). Some anesthesiologists will use a twitch monitor to determine when the patient is completely paralyzed; others prefer to wait for an appropriate time before placing a bite block and then indicate to the psychiatrist when it is time to apply the electrode(s) and provoke the seizure. Succinylcholine is very fast-acting, and if dosed properly will achieve the desired effect within 30–45 seconds (3). Nondepolarizing neuromuscular agents are less frequently employed because they are longer-acting. However, use of nondepolarizing neuromuscular agents may increase in the future as more reversal agents become available because this class

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of drugs does not produce the intense posttreatment myalgia that is sometimes seen with succinylcholine.

Physiologic Response to ECT

The autonomic response to ECT has been well documented (5). Immediately after the generalized motor seizure begins, there is a brief (approximately 10 seconds) period of parasympathetic-driven bradycardia. Thereafter, the sympathetic nervous system dominates with hypertension and tachycardia that may persist for several minutes after the procedure has ended. When hypertension is profound, the tachycardia quickly abates as the carotid body signals the heart to slow down. Resultant marked bradycardia is not uncommon and may persist until the blood pressure normalizes. In susceptible patients, this symptomatic response could precipitate myocardial ischemia or intracranial hemorrhaging, further highlighting the importance of a thorough preprocedure work-up (2). Short-acting beta-blockers can be given if needed after the seizure. Studies examining their use prophylactically before ECT found that many of these beta-blockers shortened the seizure duration (2). If there is concern about excessive bradycardia during the parasympathetic phase, glycopyrrolate can be administered. Glycopyrrolate also decreases salivation, a beneficial side effect from the anesthesiologist's perspective (2). Atropine is less desirable as it acts centrally as well; both must be used judiciously as they can exacerbate the ensuing tachycardia.

Postprocedural Management

After sufficient seizure time has elapsed, ventilation can be decreased to a normal respiratory rate while the succinylcholine and induction agent wear off. Succinylcholine only blocks the neuromuscular junction for approximately 8 minutes (3). Postprocedural myalgia is not uncommon and can be lessened by acetaminophen or a nonsteroidal anti-inflammatory agent prior to the procedure. Younger patients are more susceptible to myalgia and are sometimes given ketorolac intravenously (2). Nausea and vomiting after ECT is rare (2).

Similar to working with a surgeon in an operating room, the anesthesiologist's role in ECT is to keep the patient safe and comfortable while allowing the psychiatrist to administer the therapy in an optimal manner.

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What Is Interventional Psychiatry?

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There have been many advances in our neurobiological understanding of psychiatric conditions, and alongside these advances have emerged a range of therapeutic interventions that some would define as interventional psychiatry. The term *interventional psychiatry* can be widely encountered, from academic resumes and job advertisements to residency elective descriptions. However, defining interventional psychiatry is difficult because there is no single or widely recognized definition. The term appears to overlap with other similar terminology, which includes neurostimulation and neuromodulation. There are, however, common themes when interventional psychiatry is discussed. It generally refers to biological treatments such as ECT, transcranial magnetic stimulation, vagus nerve stimulation, and deep brain stimulation. The field not only involves looking to administer these treatments but also focuses on exploring the suitability of candidates who have been referred and providing adequate follow up assessment. These treatments are often reserved for individuals who have treatment-resistant conditions, and adequate assessment requires obtaining an extensive psychiatric and treatment history. Treatments such as deep brain stimulation require not only psychiatric expertise but also neurosurgical and radiological input, which make them expensive interventions. Additionally, it should be noted that while the term *interventional* usually corresponds to invasive treatment in other disciplines, this is not necessarily the case in psychiatry. Treatments such as ECT and transcranial magnetic stimulation are not procedurally invasive.

Interventional psychiatry is a growing field, although largely viewed as being in its infancy. With the exception of ECT, the majority of interventional treatment modalities have only been used to treat psychiatric disorders in the last decade. As the most widely available interventional treatment, ECT is administered to more than 100,000 Americans per year (1). Other available interventional procedures are much less commonly performed. For example, major studies in the use of deep brain stimulation for depression may involve as few as 20 patients (2). Additionally, while ECT can be used to grossly stimulate the brain, other interventional modalities, such as deep brain stimulation and transcranial magnetic stimulation, target discrete areas of the brain. As a result, the majority of research in interventional psychiatry has focused on mood disorders, since the areas associated with affective disturbances are becoming better anatomically delineated. As a rule, interventional psychiatry is practiced and developed within academic psychiatry departments through research funding. Presently, the field is primarily research-focused, with its target population generally consisting of patients with treatment-resistant conditions. Interventional psychiatry is an important modality for future clinicians to understand, and as the field continues to grow, it will become more clinically orientated as well as more widely used.

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Case Report

Night Terrors Secondary to Medication in an Active Duty Air Force Pararescueman

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Case

"Airman X" was a 38-year-old married, Caucasian, active duty Air Force pararescueman who presented to an outpatient mental health clinic after being referred by his primary care physician for new-onset sleep disturbances, which he described as "frequent nightmares." At the initial psychiatric evaluation, the patient stated that he had strained an intercostal muscle 4 months prior while participating in a session of mixed martial arts. He presented to his flight surgeon the following morning when the pain became too intense to manage with nonsteroidal anti-inflammatory drugs alone. The patient was prescribed a short supply of oxycodone/acetaminophen, cyclobenzaprine, and diazepam to take on an as-needed basis. The following night, he described being awakened abruptly in the "middle of the night" in a state of panic and fear. He stated that he was extremely emotional and was "bawling." He said that he had felt very confused and was unaware of what exactly was scaring him. He also stated that this episode lasted approximately 10 minutes, and after about an hour, he was able to go back to sleep. Immediately upon waking, he was breathing very fast, as though he had "just finished a sprint," and he was sweating profusely. He reported that his wife told him that he was moving around somewhat violently in the moments before waking and that at the moment he awakened, he was screaming and confused. He stated that he vaguely remembered the episode the following morning, but his wife helped him to remember the details by describing them to him. However, he could not recall any of the details of the dream/nightmare content. Similar episodes occurred two to three times per week for the following 2 weeks when (at that time) he sought medical attention to address these symptoms. He presented to his primary care physician, who told him that the symptoms were likely a side effect of the cyclobenzaprine. He was advised to discontinue the previously prescribed pain medications immediately, which he did. For the next 3 months, despite no longer taking the medications, similar episodes occurred, from once a week to two to three times per week. Then, approximately 4 months after his first episode of sleep disturbance, Airman X was examined for his annual flight physical. At that time, he reported the persistence of the "nightmare-like" events, and a referral to the mental health department was made. The patient was seen for a psychiatric evaluation approximately 2 weeks later.

Approximately 4 months after his initial evaluation, Airman X was seen in the outpatient mental health setting for one more session; he had been symptom-free for 3 months prior to this follow-up mental health appointment. In the interim of the two mental health encounters, he underwent an overnight sleep study to rule out obstructive sleep apnea. The sleep study revealed mild sleep-related-disordered breathing, with moderate upper airways resistance syndrome, and no supine REM sleep. A diagnosis of obstructive sleep apnea was not entirely ruled out. Thyroid level and complete blood count laboratory findings were negative, eliminating thyroid disorders and anemia as causes of the symptoms. At his second mental health evaluation, the patient's case was closed, since he had been asymptomatic for the 3 preceding months.

Discussion

The differential diagnoses in parasomnias, which encompass nightmares as a significant symptom, include night terrors and nightmare disorder. Posttraumatic stress disorder (PTSD) is also discussed, since nightmares are a defining symptom of the disorder. Night terrors are described in the literature as a parasomnia, characterized by sudden arousals from deep (polysomnography readings during nonREM stage 4) sleep during which the individual may present with a constricted awareness of his or her surroundings. They often manifest as a terrified, "blood curdling" scream from the dreamer accompanied by intense autonomic discharge and motor activity, which is typically stereotyped, perseverative, and less purposeful (1–2). Nightmare disorder is also a parasomnia but is described as encompassing vivid and terrifying nocturnal episodes in which the dreamer is abruptly awakened from sleep. Typically, the dreamer wakes from REM sleep and is able to describe a detailed, associative, often bizarre dream plot. Usually, the dreamer has difficulty returning to sleep. Additionally, nightmares are a defining symptom of PTSD and are often associated with disturbed sleep and altered daytime behavior, which is best described as hyperarousability. Persons with PTSD generally report awakening from dreams that involve reliving the trauma. In theses dreams, they experience strong emotions, such as rage, intense fear, or grief, which would have been appropriate reactions to the original traumatic event. PTSD-associated nightmares generally occur during REM sleep (3).

The nature of Airman X's symptoms was most consistent with night terrors because of his abrupt awakening in a disoriented, amnestic mental status as well

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as his state of fear/panic that was usually preceded by purposeless movement and a scream. Night terror disorder is more commonly encountered during childhood, with prevalence rates of 1%–6.5% (4). The adult prevalence rate is unknown. Nightmare disorder and PTSD were not consistent with Airman X's described history. The literature suggests that patients diagnosed with a parasomnia are much more likely to have a history of mood and anxiety comorbidities (4). Airman X had no previous psychiatric or substance abuse history.

The medications prescribed to Airman X for his musculoskeletal pain (i.e., diazepam [a sedative], oxycodone/acetaminophen [narcotic analgesics], and cyclobenzaprine [a muscle relaxant]), likely contributed to, if not caused, his presenting symptoms. It is unknown whether he had been taking an over-the-counter medication or a dietary supplement that could have contributed to his symptoms. The Naranjo Scale is a widely cited questionnaire used to estimate the likelihood of an adverse drug reaction that is actually the result of a medication rather than the result of other factors (6). Based on our patient's score, which was 5, the likelihood was defined as a probable adverse drug reaction.

A review of the literature revealed that parasomnias have been associated with several specific classes of medications, with sedative/hypnotics, beta-blockers, and amphetamines being the most common (4–5); one of which (sedative) Airman X was taking at the onset of his symptoms. To our knowledge, there are no published case reports with cyclobenzaprine being implicated as a cause of parasomnias. Additionally, sleep deprivation, stressful events, sleep apnea (not completely ruled out in the present case), and the use of CNS depressants (the patient was taking a narcotic pain reliever during onset of his parasomnia symptoms) have been identified as predisposing factors to parasomnias (4). Based on our patient's history, the most likely diagnosis was night terror disorder medication onset.

Dr. Hollingsworth completed his psychiatry residency training program in June 2011 at the University of Texas Health Science Center, San Antonio. He is now an active duty U.S. Air Force staff psychiatrist at Randolph Air Force Base, Tex. Jessica Hollingsworth is a second-year medical student in the School of Medicine, University of Texas Health Science Center, San Antonio.

The views expressed are those of the authors and should not be construed to represent the position of the Air Force or U.S. Department of Defense.

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A Residents' Guide to Telepsychiatry

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Telemedicine has grown to encompass everything from communicating with one's patients over the telephone and via e-mail to participation in high-definition videoconferencing sessions in real-time at great distance. The purpose of the present article is to focus on the latter, examining its potential to affect medicine in general and the field of psychiatry in particular by addressing the mental health needs of rural America.

Mental illness is woefully undertreated, and telepsychiatry can play a major role in bringing services to areas of the country where they do not exist (1, 2). It gives patients in the most rural communities access to the same level of psychiatric care as individuals in major metropolitan areas. There are costs associated with the equipment and infrastructure, but once these initial expenses are met, telepsychiatry can be less expensive than traditional care, with the primary area of savings being travel costs (3, 4).

Telepsychiatry vs. Face-to-Face Evaluations

Seeing your patient on a screen (no matter how high the definition) cannot fully replace the experience of being in the same room with him or her. Not picking up subtle nuances in body language coupled with the latency that is present in even the most high-speed connection are limitations that keep a telemedicine visit from fully replacing a face-to-face office visit.

This leads many people to believe that telepsychiatry cannot compare with face-to-face care. Such conclusion is not based on evidence; it is a speculation that has been proven wrong time and time again, especially with regard to follow-up care of established patients or psychiatric consultations (1, 4). However, even in the case of new patients who have never utilized teleconferencing for medical care, patient satisfaction rates are just as high as those for face-to-face office visits (2). And for some patient populations, such as technically savvy children and adolescents, telepsychiatry might even be more effective than face-to-face care. The novelty factor of the technology in particular has been shown to make telepsychiatry more appealing to the child and adolescent population (5).

Telepsychiatry has several advantages over other forms of telemedicine and even traditional mental health care. A psychiatric examination, as opposed to a physical examination, can be performed just as easily over live video as in person. Telepsychiatry saves in terms of costs, not just with regard to travel expenses for the patient or provider but in terms of staffing and other administrative overhead (4). Additionally, in our society where mental illness still carries a strong stigma, the anonymity that telemedicine can provide often outweighs any of its limitations. Rather than parking their car in front of a psychiatrist's office, patients can be seen at any medical clinic or in their own homes (5).

Form and Function

Telepsychiatry also allows patients to be seen in remote emergency departments that do not have a psychiatrist on staff, decreasing the time it takes for a suicidal patient to be seen by a specialist and relieving overcrowded emergency departments. This model is also being developed for disaster psychiatry, providing victims with faster access to psychological first aid responders (6). Telepsychiatry has also been used in forensics, where an isolated population, such as prison inmates, can be given earlier access to care while maintaining needed security measures (7).

There are even forms of telepsychiatry that allow for patients to be seen at a later time, referred to as asynchronous or "store-and-forward" telepsychiatry, in which patients are videotaped by a third-party and then the provider is able to view the recording later and give a diagnosis as well as treatment recommendations. There are limitations, of course, such as not being able to immediately ask the patient questions, but asynchronous telepsychiatry can work especially well if the patient and provider speak different languages, since translation of the video by a third-party can be performed ahead of time (8).

Legislation and Reimbursement

Legislation frequently lags behind technology, and it is struggling to catch up with the leaps and bounds that telemedicine has made in recent years. Practicing telepsychiatry from state to state is difficult at best, with physicians required to be board certified in the state in which they practice as well as the state(s) in which their patients reside. But even within the borders of a single state, the legal and insurance pitfalls of starting a telepsychiatry practice can be daunting. Most insurance companies require that a patient be seen in a point of service that is at least a clinic, although some indicate that the patient location automatically becomes the point of service during follow-up care (9, 10).

Medicare covers telepsychiatry, as does Medicaid, in most states, but the criteria for coverage and reimbursement are very specific and are moving forward slowly compared with the technology itself. For example, there are three restrictions that must be met in order for Medicare to reimburse at the same rate as face-to-face care: 1) the patient must reside in a non-metropolitan area, 2) the patient must be located in a qualifying facility and accompanied by a qualified staff person, and 3) the "procedure" or services rendered must be approved (such as a consultation or pharmacologic management) (11).

Safety and Security

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The biggest warnings from those opposed to telepsychiatry are with regard to safety (6). What happens if the person on the other end of a telepsychiatry session becomes suicidal or homicidal? If the point of service is a clinic or nursing home, the same security and law enforcement notification procedures apply as they would in the physician's office (12). But what if the patient is at home, voices suicidal ideation, and then severs the connection? The provider needs to know the contact information of local law enforcement ahead of time, especially because the precise whereabouts of the patient may be unknown.

Medical record security and patient privacy are other major concerns in telepsychiatry, but legislation has driven this area of the technology to the point that for most reimbursable forms of telepsychiatry, the security is as high or higher than that for most electronic medical record systems (4, 10).

Looking Ahead

Telepsychiatry has already started to show an effect in mental health care, most noticeably in rural areas that are more frequently being directly served by metropolitan-based psychiatrists. In the coming years, changes to state and federal legislation and regulations will allow this method of service to become more ubiquitous and more effective across state borders (12). We will also witness more telesupervision, where a psychiatrist supports psychiatric nurse practitioners in remote locations in managing more difficult patients (13). This model combines face-to-face care with teleconferencing technology in a manner that may be more acceptable to patients and the current health care establishment. Telecollaboration with primary care physicians will also become more widely used.

Telepsychiatry will continue to grow and change with expanding technology. As more patients in rural areas obtain high-speed Internet connections and start to use online video connections for personal interactions, they will begin to request something similar for their professional as well as health care communications.

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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)

This month's questions are courtesy of Monifa Seawell, M.D., Associate Editor of the Residents' Journal.

Question #1
Which of the following is a feature of binge eating disorder?

A. Binge eating occurs, at minimum, 2 days a week for a period of 2 months.
B. Binge eating may occur in the absence of physical hunger.
C. An improved self-image is present after overeating.
D. Binge eating is paired with purging behaviors.
E. There is a marked fixation on weight control associated with the binge eating.

Question #2
An 18-year-old female gymnast is preoccupied with her body image and weight. Although her weight is 76% of the ideal weight for women of similar age and height, she reports intense fears of becoming obese, frequently describes herself as "chubby and gross," and uses laxatives daily. She dismisses friends' concerns about her thinness and exercises 4 to 5 hours per day. She reports normal menses. Which of the following is the most accurate diagnosis?

A. Laxative misuse disorder
B. Anorexia nervosa, restricting type
C. Anorexia nervosa, binge eating/purging type
D. Eating disorder not otherwise specified

ANSWERS

Answers to September Questions. To view the September Test Your Knowledge questions, go to http://ajp.psychiatryonline.org/cgi/data/168/9/A54/DC2/1.

Question #1
Answer: D
Regardless of sex or race, the overall physician suicide rate in the United States is double that of Caucasian American men (1). Death by suicide also occurs more frequently among physicians than among other professionals of similar age and gender as well as persons in the general population of similar age and gender (2).
When gender is considered, suicide is "250% to 400% higher among female physicians" than among other professionals (2). Compared with the general population, suicides among female physicians are also significantly elevated (3). When both race and gender are considered, the likelihood of death by suicide for Caucasian male and female physicians is significantly greater than among other Caucasian professionals (4).

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Question #2
Answer: A
The two greatest risk factors for physician suicide include history of mental illness and substance use disorders (1–3). Although there is a heightened prevalence of substance use disorders among psychiatrists, anesthesiologist, and emergency medicine physicians, the data are conflicting as to whether or not choice of medical specialty directly increases the risk of suicide (4–5). Lack of personal support and occupational demands of being a physician may contribute to the physician suicide risk (6) but are not the two greatest risk factors.

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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. Seawell; mseawell@med.wayne.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.

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.

November 2011
Section Theme: Autistic Disorders
Guest Section Editor: Arshya Vahabzadeh, M.D.
arshya.vahabzadeh@emory.edu

December 2011
Section Theme: Sleep
Guest Section Editor: Dawn Flosnik, M.D.
pitt2psu@gmail.com

January 2012
Section Theme: PTSD and Traumatic Brain Injuries
Guest Section Editor: Brandon Cornejo, M.D., Ph.D.
cornejo.brandon@gmail.com

February 2012
Contact Sarah M. Fayad: fayad@ufl.edu

March 2012
Section Theme: Memory Disorders
Guest Section Editor: Sarah Jane De Asis, M.D.
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April 2012
Section Theme: Family Psychiatry
Guest Section Editor: Michael Ascher, M.D.
michaelaschermd@gmail.com

May 2012
Section Theme: Sexual Disorders
Guest Section Editors: Almari Ginory, M.D., Laura Mayol-Sabatier, M.D., and Nicole Edmond, M.D.
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