# The Management of Alcohol Use Disorders: The Impact of Pharmacologic, Affective, Behavioral, and Cognitive Approaches

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#### LESSONS LEARNED AT THE INTERFACE OF MEDICINE AND PSYCHIATRY

The Psychiatric Consultation Service at Massachusetts General Hospital (MGH) sees medical and surgical inpatients with comorbid psychiatric symptoms and conditions. During their twice-weekly rounds, Dr Stern and other members of the Consultation Service discuss diagnosis and management of hospitalized patients with complex medical or surgical problems who also demonstrate psychiatric symptoms or conditions. These discussions have given rise to rounds reports that will prove useful for clinicians practicing at the interface of medicine and psychiatry.

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Dr Stern is an employee of the Academy of Psychosomatic Medicine, has served on the speaker's board of Reed Elsevier, is a stock shareholder in WiFiMD (Tablet PC), and has received royalties from Mosby/Elsevier and McGraw Hill. Drs Carter and Sharon report no conflicts of interest related to the subject of this article.

Prim Care Companion CNS Disord 2014;16(4):doi:10.4088/PCC.14f01683 © Copyright 2014 Physicians Postgraduate Press, Inc.

Submitted: May 29, 2014; accepted June 25, 2014. Published online: August 21, 2014. Funding/support: None reported. Corresponding author: Jocelyn Carter, MD, MPH, Academic Hospitalist Service, Massachusetts General Hospital, 50 Staniford St, Suite 503A, Boston, MA 02114 (JCARTER0@mgh.harvard.edu). H ave you ever wondered whether your patients truly understand the consequences of their substance abuse and use? Have you ever been amazed by their seeming lack of insight into their situation or their apparent inability to alter their behavior? Have you ever wondered how you could improve their adherence to health-promoting activities to prevent morbidity and mortality? If you have, then the following case vignette and discussion of pharmacologic, affective, behavioral, and cognitive interventions should prove useful.

### **CASE VIGNETTE**

Mr A, a 51-year-old former musician with chronic alcoholism (complicated by delirium tremens and withdrawal seizures) and multiple inpatient rehabilitation stays for addiction counseling and detoxification, as well as depression, hypertension, chronic back pain (on disability), and migraines, arrived at the emergency department with a right-sided headache and confusion after a fall. In the emergency department, Mr A was intoxicated; he had a right facial contusion and right temporal head laceration. On interview, Mr A reported having lost his balance (which resulted in the fall); he denied chest pain, shortness of breath, palpitations, or a loss of consciousness. Mr A told the staff that he had consumed a pint of alcohol 12 hours earlier. His medications included sertraline (25 mg nightly) and amlodipine (10 mg daily). He denied using other substances or having any family history of psychiatric illness. On physical examination, he had a bilateral upper extremity tremor and tongue fasciculations. An electrocardiogram showed no signs of arrhythmia or ischemia. A computed tomography scan of the head demonstrated no ischemic or hemorrhagic findings. Basic laboratory analysis and toxicology testing was significant for a blood alcohol level of 450 mg/dL (range, 0-5,000 mg/dL). Due to concerns for impending alcohol withdrawal, intravenous thiamine and benzodiazepines were administered, and Mr A was admitted to a medical unit for further care.

Following admission to the medical unit, Mr A requested that he be discharged, stating that he felt better. A psychiatry consult was called to assess his capacity to leave the hospital against medical advice. Although the consultant concluded that Mr A had the capacity to leave the hospital, given that he had > 50 visits to the emergency department within the past year for various complaints associated with alcohol intoxication, a rehabilitation stay focused on recovery was recommended. Both Mr A's mother and sister who lived locally were contacted for support (of Mr A and his care plan); however, they refused to get involved in his aftercare. Several hours later, Mr A's nurse noted that he and his belongings were no longer in his room. Hospital security was notified, and an extensive search for Mr A proved fruitless.

#### WHAT IS ALCOHOL USE DISORDER/ALCOHOLISM?

Alcoholism, or heavy drinking, is defined by the US National Institute on Alcohol Abuse and Alcoholism (NIAAA) as consuming  $\geq$  4 drinks daily (or

- Alcohol use disorder is a complex disease affecting 18 million people in the United States; its pathophysiology is driven by the mesolimbic dopaminergic system.
- Use of screening, brief intervention, and referral to treatment as recommended by the Joint Commission and the US Preventive Services Task Force has been demonstrated to reduce rates of alcohol use and heavy drinking and increase access/referral for treatment among inpatients hospitalized for alcohol intoxication or withdrawal.
- Recovery tends to be an iterative process aided by a variety of medications (including naltrexone, dilsulfram, topiramate), interventions, and therapies (including self-help groups, behavioral therapy, and community therapy).
- Barriers to successful treatment include denial of individuals and possible denial of those surrounding them, restricted family and community support, and self-limited insight and understanding of alcohol use disorder.

14 drinks weekly) for men or 3 drinks daily (or 7 drinks weekly) for women.<sup>1</sup> While definitions for alcohol use and alcohol dependence had been classified separately by the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*), the most recent edition of this text (*DSM-5*) has combined criteria for alcohol dependence and abuse into a single condition known as alcohol use disorder.<sup>2</sup> Meeting criteria for alcohol use disorder is based on 8 factors: tolerance; withdrawal; cravings; increased amounts of alcohol consumed over time; ineffective efforts to reduce use; interference with personal or professional life; significant amount of time spent obtaining, using, and recovering from alcohol; and continued use of alcohol despite harmful consequences. The number of met criteria determines the severity of the disorder: mild (2–3 criteria), moderate (4–5 criteria), and severe (6–7).

#### HOW DOES ALCOHOL USE LEAD TO ADDICTION?

Alcohol use disorder is thought to be mediated by several factors. The mesolimbic dopamine system in the brain is activated by alcohol in conjunction with other neurotransmitters (like corticotropin-releasing factor and y-aminobutyric acid [GABA]).<sup>3</sup> Alcohol causes the release of dopamine and simulates a state of euphoria that may drive addiction. The mesolimbic system as well as the ventral striatum, another brain area that secretes dopamine in response to exposure to alcohol, has been strongly associated with pleasure, reinforcement, and addictive behavior.<sup>4</sup> Furthermore, alcohol's ability to up-regulate GABA channels can result in continuous inhibition at the level of glutamate receptors. This, too, can promote an addiction by generating a state of disinhibition that is prompted by the absence of alcohol and by increased glutamate receptor activity that leads to symptoms of alcohol withdrawal.<sup>5</sup> Repeated fluctuations of glutamate and GABA neuronal activity may then prime the brain for both the euphoria experienced in the setting of alcohol use as well as the symptoms of withdrawal during abstinence from alcohol, and this drives the addiction cycle.

## WHAT IS THE IMPACT OF ALCOHOL USE DISORDER IN THE UNITED STATES TODAY?

Alcohol use disorder is a major cause of morbidity and mortality in the United States. The NIAAA reports that 18 million people in the United States meet criteria for alcohol use disorder.<sup>6</sup> According to the Centers for Disease Control (CDC), 88,000 people die each year in the United States from consequences of excessive alcohol intake.<sup>7</sup> In addition, the cost of excessive alcohol use in the United States has been estimated to exceed \$220 billion annually, including losses related to workplace productivity (72% of the total cost), health care expenses for problems caused by excessive drinking (11% of the total), criminal justice repercussions and expenses (9% of the total), and motor vehicle crash costs from impaired driving (6% of the total).<sup>8</sup>

Overall, alcohol is the fifth leading cause of disability for men and the 11th leading cause of disability for women in the United States.9 The detrimental effects of alcohol use disorder on health and wellness are extensive.<sup>9</sup> Acutely, individuals suffering from alcohol withdrawal are at risk for delirium tremens,10 seizures, and arrhythmias that can be fatal. Subacute or chronic clinical consequences of alcohol use disorder include liver disease, cirrhosis,<sup>11-13</sup> atrial fibrillation,<sup>1,14,15</sup> cardiomyopathy,<sup>16</sup> head and neck/gastrointestinal cancer,<sup>17–19</sup> neuropathy,<sup>20,21</sup> pancreatitis,<sup>22,23</sup> and anemia/thrombocytopenia, as well as both anxiety<sup>24</sup> and depression.<sup>25</sup> Alcohol use disorder has also been associated with increased rates of problems with finances, personal relationships, home life, and employment.<sup>26</sup> Increased rates of violence as well as injuries have also been documented.<sup>27</sup> Individuals with alcohol use disorder are also at increased risk for suicide attempts.<sup>28</sup> A national survey conducted in 1999 demonstrated that those with alcohol use disorder are 4.6 times more likely to experience suicidal ideation and are 6.5 times more likely to attempt suicide than are those without an alcohol use disorder.<sup>29</sup> Moreover, alcohol has been identified as an independent risk factor for completed suicide in those with alcohol use disorder<sup>30</sup> and in those without a history of alcohol use disorder.<sup>31</sup>

#### WHO DEVELOPS ALCOHOL ADDICTION?

While limiting alcohol intake has been recommended for all individuals, certain people seem to develop alcoholism more often than others. A survey of adults who developed alcohol use disorder indicated that two-thirds started to drink excessively before the age of 25 years.<sup>32</sup> There is also evidence that genetic predisposition can drive development of alcoholism, with a 4-fold risk of alcohol use disorder in relatives of those with alcoholism.<sup>33</sup> For reasons that remain unclear, men are also more than twice as likely to develop an alcohol use disorder as women.<sup>4</sup> Women, however, are more likely than men to develop serious health consequences (including liver disease or death) associated with alcohol use. In a 44,000-person survey conducted as part of the National Epidemiologic Survey of Alcohol and Related Conditions,<sup>34</sup> alcohol use disorder was 2.6 times more common in those with a mood disorder and 1.7 times more prevalent in those with an anxiety disorder. Stressful experiences including history of childhood abuse (physical or sexual)<sup>35</sup> and social isolation<sup>36</sup> have also been associated with susceptibility to alcohol use disorder.

#### WHAT FACTORS DRIVE ALCOHOL RELAPSE?

Several factors have been identified as potentially driving relapse in individuals with alcohol use disorder. A study examining relapse vulnerability in recently sober individuals demonstrated differences in impulse control and emotional awareness compared to those without a history of alcohol use disorder.<sup>37</sup> The Substance Abuse and Mental Health Services Administration has also identified early environmental and social predictors (including having housing, maintaining a productive job, having no legal involvement, maintaining a support network [such as 12-step meeting attendance], and maintaining abstinence) of success in maintaining sobriety among those with substance use disorders.<sup>38</sup> In particular, attendance at 12-step programs<sup>39</sup> and participation in social work interventions have protected against relapse in alcohol use disorder.<sup>40</sup> Consistent with what is known about the neuropathophysiology of the mesolimbic dopamine system, functional magnetic resonance imaging studies have demonstrated increased alcohol-associated cueing and limbic brain activity in those more prone to relapse.<sup>41</sup> Since the limbic system is generally viewed as being associated with subconscious behavior, this finding may suggest that the clinical pathophysiology that drives relapse may be outside of consciousness.

#### HOW OFTEN DO ALCOHOLICS DISPLAY INSIGHT INTO THEIR DISEASE AND UNDERSTAND THE CONSEQUENCES OF THEIR ADDICTION?

Studies that have examined insight and awareness about addiction in alcoholics are limited. A small Australian study of recovering opioid-addicted individuals on opioid substitutes demonstrated that less than half of the patients who screened positive for excessive drinking (via an elevated Alcohol Use Disorders Identification Test score) believed that they had a drinking problem.<sup>42</sup> Another study of 90 patients that examined the factors associated with alcohol cessation that were required for liver transplant among patients with alcohol-induced cirrhosis showed that those with awareness of their disease were more than 5 times as likely to complete a 6-month period of sobriety compared to those without such awareness.<sup>43</sup>

Other studies have considered cognitive alterations among those with alcohol use disorder. Links between impaired memory, executive dysfunction, and low motivation have been identified in patients with alcohol use disorder. Conversely, an association between having good decisionmaking skills and high motivation has been seen in patients without an alcohol use disorder.<sup>44</sup>

#### HOW IS ALCOHOL ADDICTION BEST TREATED IN INPATIENT OR PRIMARY CARE SETTINGS?

Several strategies are available to manage alcohol use disorder. For those in acute alcohol withdrawal, use of benzodiazepines is considered the standard of care for the prophylaxis of delirium tremens and seizures, 2 of the most serious sequelae of alcohol withdrawal.<sup>45,46</sup> While antiepileptic therapy (eg, carbamazepine, oxcarbazepine, phenobarbital) and  $\gamma$ -hydroxybutyrate have emerged as a potential treatment for alcohol withdrawal, there is limited evidence to recommend antiepileptic drugs or GABA as a primary therapy for alcohol withdrawal.<sup>47–49</sup> Baclofen has also been proposed as an equally effective treatment for alcohol withdrawal; however, studies are limited (and they do not incorporate adverse effects).<sup>50</sup>

Algorithms for benzodiazepines often revolve around symptom-associated therapy.<sup>51,52</sup> Risk factors for having delirium tremens include the presence of structural brain lesions and having a withdrawal seizure as the reason for hospitalization.<sup>53</sup>

Primary prevention of alcoholism in outpatient settings holds great promise according to the US Preventive Services Task Force (USPSTF).<sup>54</sup> A systematic review of randomized controlled trials and cost-effectiveness studies demonstrated both cost effectiveness and cost savings.<sup>55</sup> The USPSTF recommended screening all adults for alcohol use disorder using a threshold of >1 drink daily/7 drinks weekly for women and  $\geq$ 2 drinks daily/14 drinks weekly for men.<sup>56</sup> Validated screening tools for identifying alcohol use disorder include the CAGE questionnaire (Cut-down, Annoyed, Guilt, Eye-opener), the Alcohol Use Disorders Identification Test, and the Michigan Alcoholism Screening Test.<sup>57</sup>

The Joint Commission currently recommends screening, brief intervention, and referral to treatment (SBIRT) for all inpatients admitted for reasons related to alcohol use disorder.<sup>55,58</sup> This strategy focuses on reducing variation in inpatient and postacute care for this patient population<sup>59</sup> and has led to reductions in alcohol use and heavy drinking, as well as to increased access/referral for treatment.<sup>60</sup> While there have been some negative studies,<sup>61,62</sup> the majority of the research conducted has demonstrated decreased alcohol consumption and reduced rates of injury in those who have engaged in SBIRT.<sup>63,64,65</sup>

#### HOW CAN INTERVENTIONS BE EFFECTIVELY DEPLOYED TO REDUCE RATES OF ALCOHOL USE DISORDER?

While alcohol use disorder is recognized as a complex problem without a single solution, the interventions described above (including primary care-mediated behavioral counseling and inpatient counseling [SBIRT]) are supported by the NIAAA, the Joint Commission, and the USPSTF. The NIAAA has also proposed epidemiologically based alcohol use guidelines (eg, recommending consumption of  $\leq$  1 standard alcohol drink per day for adult women and those older than 65 years and  $\leq$  2 standard alcohol drinks

© 2014 COPYRIGHT PHYSICIANS POSTGRADUATE PRESS, INC. NOT FOR DISTRIBUTION, DISPLAY, OR COMMERCIAL PURPOSES, Prim Care Companion CNS Disord 2014;16(4):doi:10.4088/PCC.14f01683 per day for adult men) to limit the risks for short- and longterm drinking-related consequences.<sup>66</sup> The CDC has also recommended a series of alcohol use reduction initiatives (eg, maintaining limits on the timing of alcohol sales and the regulation of alcohol outlet density) to the general population.<sup>67</sup>

### HOW CAN THE PROCESS OF CHANGE BE UNDERSTOOD?

Prochaska and Diclemente<sup>68</sup> developed the transtheoretical model to describe the gradual and nonlinear aspects of behavioral change. They proposed that change is a process rather than an isolated event; change progresses through 5 stages (precontemplation, contemplation, preparation, action, and maintenance) that often involve regression to earlier stages before materializing.

In the precontemplative stage, "ignorance is bliss" and denial is the primary defense mechanism. Individuals do not acknowledge the presence of a problem and therefore do not consider or pursue venues to change their behaviors.

The contemplation stage begins when a person first considers that change in his or her behavior is indicated. Individuals in this stage acknowledge that their behaviors are problematic, and they gain awareness of the "pros" and "cons" of changing them. In this phase, they are still ambivalent (ie, "sit on the fence") about acting on their awareness and they procrastinate.

In the preparation stage, individuals get ready to "test the waters." They develop an action plan and demonstrate a willingness and readiness to pursue recommended treatment options for their problematic behaviors.

The action stage involves discreet intentional, tangible, and measurable modifications in one's behaviors and lifestyle. Since it is during this stage that relapse or regression to a previous stage of change is likely to occur, preventive strategies are warranted.

Maintenance signifies the acquisition of behavioral patterns and lifestyle changes that have facilitated the desired change and solidified it. While the risk of relapse is reduced during this stage and confidence has been enhanced, the ongoing practice of recovery work and relapse prevention is essential to further secure the change that has already been achieved.

#### HOW DOES DENIAL SERVE AS A BARRIER TO CHANGE?

Denial is a defense mechanism that serves to keep unpleasant internal or external realities out of one's consciousness in an attempt to allay anxiety. Denial is the key construct in the precontemplative stage of change and a major barrier to change and acceptance. Penetrating denial involves raising awareness about the risks of excessive drinking and acknowledging the devastating consequences of one's drinking patterns on physical, psychological/emotional, relational, professional/vocational, and social health.

Denial can manifest by (1) the simple or outright rejection of the reality of unpleasant facts; (2) minimization and/

or rationalization, where facts are acknowledged but their seriousness is ameliorated; or (3) projection, which entails recognition of facts and their seriousness but blaming external factors/people for one's problematic behaviors instead of assuming responsibility for them. The ability to deny, to minimize, or to project/blame is what enables individuals to continue their problematic behaviors despite overwhelming evidence of their destructive nature.

Denial often reveals itself as resistance to change; numerous factors contribute to such resistance. These factors include (1) habitual long-lasting excessive drinking patterns; (2) the prevalence of alcohol use at social, familial, or work-related events; (3) conscious or unconscious enabling patterns in one's social/familial environment that impede the emergence of change; (4) fear of the unknown and adherence to the familiar, even when it is detrimental to one's well-being; (5) shame, negative stereotypes, and stigma associated with alcoholism, which is still perceived in some social and professional circles as a moral failure or as a disease of ill will; (6) fundamental doubts about success and discouragement after numerous episodes of relapse that occur during recovery; (7) co-occurrence of mental and addiction disorders; and (8) potency and efficacy of alcohol as self-medication for emotional states and conditions (eg, depression, anxiety, or social phobia).

Family, friends, and health care providers may also be in denial or "turn a blind eye" to the excessive drinking of their relative or patient. These behaviors are often unintentional. Nevertheless, when in convergence with the individual's denial, these behaviors further impede the likelihood of identifying alcohol as a problem and seeking treatment to change it.

#### ARE THERE EFFECTIVE LONG-TERM OR SUBACUTE PHARMACOLOGIC TREATMENTS FOR ALCOHOL USE DISORDERS?

Alcohol dependence is a multifaceted disorder that is influenced by genetic, biological, psychological, and environmental factors. Alcohol is a potent central nervous system depressant, and its actions are mediated via multiple neurotransmitter systems (including the GABAergic, glutamatergic, dopaminergic, serotonergic, and opiatergic systems).<sup>69</sup> There are currently 3 medications approved by the US Food and Drug Administration (FDA) for alcoholism (disulfiram, naltrexone/vivtrol, acamprosate), and several off-label medications (topiramate, baclofen) have been found to be efficacious for treating this condition.

Disulfiram was for many years the ultimate, yet highly controversial, alcohol antagonist or sensitizing drug used to achieve abstinence. Disulfiram alters the metabolism of alcohol and allows the enzyme acetaldehyde dehydrogenase to accumulate, thereby resulting in an acetaldehyde syndrome if drinking occurs while taking the drug. The syndrome is characterized by flushing, throbbing headache, nausea, vomiting, chest pain, and other symptoms that may require attention in an emergency room. Disulfiram is currently the treatment of last resort for those whose mental and physical health necessitate abstinence but who fail to commit to it; such individuals rely on an external and aversive agent.

Naltrexone comes in pill form taken orally and daily or as an injectable form given monthly. Naltrexone is an opioid antagonist that was approved by the FDA in 1994 (the injectable form was approved in 2010) for treatment of alcohol dependence. Naltrexone is not addictive and does not react aversively with alcohol. It may stimulate usually mild and transient nausea, vomiting, or stomach pain. Also, hepatic dysfunction may develop after use of high doses; therefore, repeated liver function tests are needed for monitoring and to avoid liver damage. Naltrexone's actions are based on the hypothesis that opioid receptors in the brain release endorphins that reinforce the effects of alcohol consumption. The blockade of that system reduces the rewarding aspects of drinking and curbs cravings for more alcohol. The efficacy of this drug in nonlaboratory settings depends on compliance; the alternative monthly injection of naltrexone was developed to bypass this hurdle. This drug is most effective when used in combination with adjunctive psychological, behavioral, and psychosocial treatments. Use of naltrexone for alcoholism represents a "clinical harm reduction" approach rather than an "abstinence or fail" approach characteristic of disulfiram.

Project COMBINE (Combined Pharmacotherapies and Behavioral Interventions) is a national multisite pharmacotherapy study for the treatment of alcohol dependence that started in 1997.<sup>70</sup> One of the most prominent findings and implications of COMBINE<sup>69</sup> is that naltrexone can be delivered safely in primary health care settings as long as it is prescribed with medical counseling that emphasizes adherence and compliance. Naltrexone can yield clinically significant outcomes (reduced drinking or increased abstinence) that are as compelling as and under some conditions more compelling than those observed with behavioral therapy.<sup>69</sup>

Acamprosate has been extensively used as an anticraving drug in Europe since 1989, but it was not approved by the FDA for use in the United States until 2004. Similar to the effects of ethanol, acamprosate exerts agonist actions at GABA receptors and antagonist (or inhibitory) actions on NMDA receptors, thus decreasing the craving to drink. It is fairly well tolerated; diarrhea is its main effect. Like naltrexone, it has been most efficacious when prescribed in conjunction with psychotherapy. Studies indicate that acamprosate reduces the frequency of drinking and, in combination with psychotherapy, improves the quality of life even in patients with severe alcohol dependence. In comparing acamprosate with naltrexone for treatment of alcohol use disorders, a recent meta-analysis<sup>71</sup> concluded that acamprosate was slightly more efficacious in promoting abstinence, while naltrexone was more efficacious in reducing heavy drinking and craving.

Topiramate is an anticonvulsant, but it proved beneficial in controlling impulsivity and reducing heavy drinking days, as well as prolonging continuous days of abstinence when used off-label for these conditions. Although the mechanism of action of topiramate is unclear, modulation of the dopamine reward pathways of the brain (through antagonizing glutamate receptors and stimulating GABA receptors) has been proposed as the reason for its efficacy. Thus, in alleviating cravings as well as the feelings of inner tension and discomfort, topiramate significantly decreases the likelihood of relapse. Side effects associated with this drug include burning and itching skin, a change in taste, a loss of appetite, and difficulty concentrating. A recent study<sup>71</sup> showed that low doses of topiramate as an adjunctive agent are effective in reducing cravings for alcohol and symptoms of anxiety and depression during the early phase of alcohol withdrawal. Furthermore, when combined with psychotherapeutic interventions, topiramate improves abstinence from drinking during the first 16 weeks of the postdetoxification period.<sup>71</sup> Compared to standard medications approved for alcoholism, topiramate has been found to be inferior to disulfiram in terms of days to relapse,<sup>72</sup> but superior to naltrexone in reducing cravings.<sup>73</sup>

Baclofen is a muscle relaxant and antispasmodic drug that has being investigated for its benefits in helping maintain abstinence, particularly in patients with alcoholic cirrhosis. In 2009, a French-American cardiologist, Olivier Ameisen,<sup>74</sup> published a best-selling book, *The End of My Addiction*, to document the successful use of baclofen in treating his alcoholism. Addiction, in his view, is a symptom-driven disease, and, unlike other diseases, the suppression of symptoms (such as craving, preoccupation, thoughts) should suppress the disease of alcoholism. Since then, numerous studies have been conducted to examine the efficacy of baclofen and to determine its target dose range.

### ARE THERE EFFECTIVE SELF-HELP AND PSYCHOTHERAPEUTIC TREATMENT PROGRAMS FOR ALCOHOL USE DISORDERS?

#### Self-Help Groups

Alcoholics Anonymous (AA) founded by Bill Wilson and Dr Bob Smith in Akron, Ohio, in 1935 is the most well-known self-help program helping people achieve sobriety (http:// alcoholics-anonymous.org). Alcoholics Anonymous is an international mutual aid fellowship centering on spiritual and character development using a 12-step program that relies heavily on the concept of a higher power. Its foundation (steps 1 to 3) is built on the capacity to admit powerlessness over alcohol and to surrender with faith and hope "to the care of God as we understood Him." Steps 4 to 9 involve the tasks of knowing thyself, owning and purging character defects, "forgiving away" resentments, reconciling, and making amends to all people ever harmed by one's drinking behaviors. Steps 10 to 12 constitute the maintenance phase of the program and call for living honestly, praying and meditating, embracing the spiritual awakening, and reaching out to help others who struggle with alcohol problems.

The AA 12-step approach is often criticized for its reliance on a higher power and on religious convictions. Alternative self-help groups that move away from these concepts include Secular Organizations for Sobriety (http://www.sossobriety.

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org), Rational Recovery (https://rational.org), Women for Sobriety (http://www.womenforsobriety.org), and Self-Management and Recovery Training Recovery (http://www. smartrecovery.org/). Self-Management and Recovery Training Recovery offers scientifically based tools and techniques often borrowed from cognitive-behavioral approaches to treat addiction, with an emphasis on self-empowerment, self-reliance, and self-directed change. Its 4-point program includes (1) building and maintaining motivation to abstain; (2) coping with urges; (3) managing thoughts, feelings, and behaviors; and (4) living a balanced life.

#### **Motivational Interviewing**

Motivational interviewing<sup>75</sup> is a goal-oriented and clientcentered therapeutic intervention to help people explore and resolve their ambivalence and to elicit intrinsic motivation to change problematic behaviors. Motivational interviewing uses 4 general processes that include (1) engaging the client in the process and building trust; (2) focusing on the particular set of behaviors to be changed; (3) evoking the client's perspectives, confidence, readiness, and motivation for change; and (4) planning practical steps to move into action in order to achieve the desired change. The motivational interviewing therapist asks open-ended questions in a nonjudgmental manner, provides frequent affirmations, manifests the capacity for reflective and emphatic listening, and offers periodic summary statements. The use and applicability of motivational interviewing is often considered in conjunction with Prochaska and Diclemente's stages of change.<sup>68</sup> It is a powerful approach to move people away from the precontemplation of change toward the contemplative and preparatory stages of change.

# **Cognitive-Behavioral Therapy**

Cognitive-behavioral therapy (CBT) is a well-structured, time-framed (12 to 16 sessions), evidence-based therapeutic approach that has proven applicable and efficient for a host of disorders, including alcohol dependence. The approach is based on the premise of a triangular interconnection between thoughts, feelings, and behaviors and aims to modify one's thinking processes to generate different sets of emotions and behaviors. The 2 main components of CBT are functional analysis (the explorations of thoughts, feelings, and circumstances before and after a given behavior) and skills training. The CBT approach for alcoholism first identifies the often automated, unrealistic, and overly generalized self-defeating thoughts and beliefs that perpetuate excessive drinking. Once detected, those thoughts are then replaced with more realistic and self-empowering ones. The CBT model also assists with the identification of triggers to drink (stress, anxiety, environmental cues), ways to avoid them, and strategies to cope with them. As with most other treatments for alcoholism, CBT works best when combined with other recovery efforts, such as self-help groups or use of medication.

Witkiewitz and Marlatt<sup>76</sup> offered a reconceptualized cognitive-behavioral model of relapse that focuses on the

dynamic interactions between multiple risk factors and situational determinants. In this model, clinicians gather detailed information about an individual's background, substance use history, personality, coping skills, self-efficacy, and affective states. They also assess the particular high-risk situations using cue reactivity or client-generated role-play exercises. Finally, the analysis of the interactions among these factors and the defined high-risk situations enable individuals to continually assess their own vulnerability to relapse.

#### Dialectical Behavioral Therapy for Substance Use Disorders

Dimeff and Linehan<sup>77</sup> modified the well-established dialectical behavioral therapy (DBT) to promote abstinence and to reduce the length and adverse impact of relapses among psychiatrically complicated or comorbid substance abusers. Rather than focusing on symptom management and reduction in problematic behaviors per se, DBT's emphasis is on building a life worth living. The fundamental principle of DBT is to create a dynamic—a dialectic—that promotes and unites 2 opposed goals for patients: change and acceptance. The simultaneous embrace of acceptance and change is consistent with the philosophical approach in 12-step programs (as expressed in the serenity prayer: "God, grant me the serenity to accept the things I cannot change, the courage to change the things I can, and the wisdom to know the difference").<sup>76</sup>

Dialectical behavioral therapy for substance use disorder aims at decreasing abuse of substances; alleviating physical discomfort associated with abstinence; diminishing urges, cravings, and temptations to use; avoiding opportunities or cues to use; reducing behaviors conducive to use; and increasing community reinforcement of healthy behaviors. Useful strategies include (1) negotiating for abstinence for a defined time frame or interval (from moments to days, weeks, or months) with frequent renewals of this commitment; (2) proactively preparing responses to high-risk situations; and (3) encouraging the "burning of bridges" to substance use with the clear message that continued use would be disastrous and must be avoided.

# Mindfulness-Based Relapse Prevention

Bowen et al<sup>78</sup> designed the novel treatment approach of mindfulness-based relapse prevention to foster increased awareness of triggers, destructive habitual patterns, and automatic reactions. Mindfulness practices facilitate the elimination of the automatic responses through pausing and observing one's present experiences and raising awareness to a compatible range of alternatives. Mindfulness-based relapse prevention fosters a nonjudgmental and compassionate approach toward oneself and one's experiences. The treatment approach changes an individual's relationship to discomfort and teaches one to recognize challenging emotional and physical experiences and to address them skillfully. A recent study<sup>79</sup> found more favorable long-term outcomes (decreased heavy drinking) for those receiving

mindfulness-based relapse prevention compared to others exposed to traditional relapse prevention interventions. The authors speculated that targeted mindfulness practices may support these long-term outcomes by strengthening one's ability to monitor and cope skillfully with discomfort associated with cravings or negative affect.<sup>79</sup>

#### Community Reinforcement Approach, Including Couple and Family Therapies

A community reinforcement approach,<sup>80</sup> which calls for active involvement of families, couples, and friends in the recovery journey of individuals, is a feasible and most beneficial venue that is often overlooked. A change in an individual's habitual patterns entails a necessary change in close and remote familial and social circles. Thus, successful recovery is partially contingent on the willingness and ability of people who surround these individuals to change. Family members and friends benefit from education about the recovery process and need to explore their potentially enabling patterns. It is also essential that they explore the rewards experienced by their loved one in order to achieve abstinence. These interventions need to be negotiated (in advance) between the recovering individual and his/her supports in the community. The ultimate goals of this approach are to eliminate positive reinforcement for drinking and to enhance positive reinforcements for sobriety. Help for family members and friends is also offered by AA in their Al-Anon and Alateen programs.

#### **CASE DISCUSSION**

As 1 of 18 million people in the United States afflicted by an alcohol use disorder, Mr A's case provides an all too common story for patients with alcoholism. With over 50 hospitalizations and emergency department visits over a relatively limited period, Mr A meets the DSM-5 criteria for alcohol use disorder (with a significant amount of time spent obtaining, using, and recovering from alcohol). The interruption of his musical career and severed support from his family members also demonstrates that alcohol abuse interferes with personal and professional aspects of life. While Mr A is unusual in that he started to drink heavily after the age of 25 years, the impact of his frequent and heavy alcohol use is consistent with that of others who share his affliction. Continuous activation of his mesolimbic dopaminergic system (as evidenced by his history and elevated blood alcohol levels) drove his ongoing addiction. As portrayed by our case, Mr A was appropriately managed with screening, brief intervention, and referral to treatment by his inpatient medical and psychiatric providers (as recommended by the Joint Commission). However, his inability to maintain a productive job and social support network, in concert with his impulsivity (as indicated by his elopement from the hospital), make Mr A's propensity for relapse quite high. In addition, his limited insight and denial of the consequences of his alcohol use disorder make successful treatment and long-term sobriety a challenge. As a result, Mr A was unable to complete his hospital-based detoxification

using benzodiazepine therapy and to be transferred to an inpatient facility as a bridge to routine counseling, behavioral therapy, and long-term pharmacologic management. Ideally, preventive measures (including screening in primary care settings with the CAGE questionnaire, as recommended by the USPSTF), as well as CDC-recommended population/ community-based alcohol reduction initiatives (maintaining limits on the timing of alcohol sales and the regulation of alcohol outlet density), could have improved Mr A's chances to avoid chronic alcoholism and its telltale trail of frequent inpatient hospitalizations. Mr A was precontemplative (in terms of his willingness to consider abstinence); his denial fed his cycle of alcoholism and his resistance to change. He appeared to have limited, if any, support in the community as evidenced by the refusal of his family members to be actively involved in his care during his inpatient admission. Given the complexity of the neuropathology of alcohol addiction and the limited insight, understanding, and support of patients like ours (ie, Mr A) who use and abuse alcohol, recovery will be an iterative process. While none of the described interventions, treatments, or therapies alone is sufficient, with persistent and consistent efforts to address the ongoing needs of those with alcohol use disorder, decreased rates of usage can be attained.

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