Integrative management of alcohol and substance abuse

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Unmet needs

- Annual costs associated with alcohol and drug abuse in the United States estimated at $246 billion
- **The high cost of alcohol and drug abuse reflects a crisis of epidemic proportions that has not been adequately addressed by available conventional approaches including mainstream pharmacological treatments, psychotherapy and social programs.**

Conventional therapies are *moderately* effective

- Controlled trials and patient surveys confirm that many conventional pharmacological and psychosocial treatments of alcohol and drug abuse or dependence are *only moderately effective* in terms of discontinuation rates and long-term abstinence (Carroll, 1996; McLellan, Metzger, Alterman, Cornish, & Urschel, 1992; Emrick, 1987).

Integrative Management begins with history and assessment

- History includes symptom severity, course, co-morbid psychiatric and medical problems, previous conventional and CAM Rx.
- Assessment includes interview, labs if indicated, and other approaches to identify cultural, social, psychological, biological factors contributing to substance abuse
- Treatment planning takes place in context of patient preferences, resources, financial constraints, what has worked before, etc.
- An optimum integrative plan includes established safe conventional pharmacological/psychosocial Rx and the non-conventional Rx that are safe in combination with conventional therapies acceptable to the patient, locally available and affordable.

Non-pharmacological therapies

- Part I: *direct* biological effects
  - dietary modifications (alcohol abuse)
  - vitamins and minerals (alcohol abuse)
  - amino acids
  - medicinal herbs
- Part II: *indirect* biological effects
  - exercise
  - mindfulness training
  - cranio-electrotherapy stimulation,
  - virtual reality graded exposure therapy
  - light exposure therapy
  - acupuncture
  - qigong

Complementary vs integrative management

- Most non-conventional approaches can be used alone or together with established pharmacological or psychosocial Rx
- Studies on comparative efficacy of integrative vs stand-alone CAM or conventional modalities have not been done
- ***Critical role of patient motivation, autonomy and supportive environment (12-step group) for success of any treatment program***

Dietary modification

- Malnourishment caused by malabsorption of essential nutrients through the mucosa of the stomach and small intestines, resulting in reduced serum levels of thiamine, folate, vitamin B6 (Gloria et al 1997)
- Hypoglycemia results from toxic effects of alcohol on the liver and can manifest as confusion, anxiety, and impaired cognitive functioning.

Dietary modification

- Rational approaches to malnourishment in chronic alcoholics include avoidance of refined carbohydrates, and increased consumption of complex carbohydrates and protein.
- Improved general nutrition correlates with higher abstinence rates (Guenther, 1983; Lieber 1991).

Vitamins and minerals (alcohol abuse)

- Low serum thiamine levels possibly correlated to increased alcohol craving (Zimatkin & Zimatkina, 1996)
- Niacin (nicotinamide (1.25 g) taken with a meal before drinking may protect the liver against acute toxic effects of alcohol (Volpi et al., 1997)
- When a patient is unable to stop drinking, taking antioxidant vitamins close to the time of alcohol consumption *may reduce or prevent* hangover symptoms by neutralizing metabolites of alcohol that cause oxidative damage to the brain (Altura & Altura, 1999; Marotta et al., 2001)

Vitamins and minerals (alcohol abuse)

- Taking vitamin C (2 g) 1 hour before alcohol consumption increases the rate at which alcohol is cleared from the blood, possibly reducing acute toxic effects on the liver (Chen, Boyce, & Hsu, 1990)
- Deficiencies in zinc, copper, manganese, and iron are common in alcoholics and worsen with continued heavy drinking.

Vitamins and minerals (alcohol abuse)

- Magnesium supplementation at 500 to 1500 mg/day may improve neuropsychological deficits associated with chronic alcohol abuse by improving cerebral blood flow, which is often diminished in alcoholics (Thomson, Pratt, Jeyasingham, & Shaw, 1988)
- ***Probable benefits and no contra-indications*** to dietary modifications or supplementation with the vitamins and minerals when taking conventional drug therapies for the management of relapse prevention, craving or withdrawal.

Vitamins and minerals (alcohol abuse)

- All individuals who struggle with alcohol or drug abuse, or who are in recovery following chronic abuse, should be strongly encouraged to optimize their nutritional status by ***changing eating habits and taking appropriate supplements to compensate for a probable alcohol-related malabsorption syndrome, to mitigate the toxic effects of abuse on the body and brain, and to reduce craving and the severity of withdrawal.***

Amino acids: general (alcohol abuse)

- Malnutrition and malabsorption in chronic alcoholics often lead to deficiencies in important amino acids including taurine, SAMe, tyrosine, L-tryptophan, and acetyl-L-carnitine.
- Supplementation with amino acids helps to lessen the severity of withdrawal symptoms, protect the liver, and restore normal brain function in chronic alcoholics.

Amino acids: taurine (alcohol abuse)

- Taurine supplementation *may* lower the serum level of acetaldehyde, a toxic metabolite of alcohol that can interfere with normal mental functioning (Watanabe, Hobara, & Nagashima, 1985)
- Small controlled trial, 60 patients hospitalized for acute alcohol withdrawal were randomized to taurine (1 g 3 TID) versus placebo. Significantly fewer severe withdrawal symptoms, including delirium and hallucinations, were observed in the taurine group (Ikeda, 1977). ***Needs replication***

Amino acids: SAMe (alcohol abuse)

- *S*-adenosylmethionine normally present in the liver is depleted by chronic alcohol abuse.
- Chronic alcoholics who take SAMe at doses of 400 to 800 mg/day ***may*** have less severe liver damage (Lieber, 1997, 2000a,b).
- SAMe is a logical choice when treating ***depressed patients who abuse alcohol*** (Agricola, Dalla Verde, & Urani, 1994).
- SAMe supplementation ***may*** reduce alcohol intake (Cibin et al., 1988).

Amino acids: L-tryptophan

- Low serum levels of l-tryptophan are correlated with low serotonin in a subset of alcoholics who are at increased risk of developing early-onset alcoholism associated with antisocial behavior suggesting that ***long-term supplementation with L-tryptophan (or 5-HTP) may be a useful preventive intervention in this high-risk population*** (Virkkunen & Linnoila, 1993)
- Taking l-tryptophan before drinking may reduce the severity of cognitive impairment associated with alcohol use (Westrick, Shapiro, Nathan, & Brick, 1988)

Amino acids: ALC and tyrosine

- Abstinent alcoholics treated with acetyl-l-carnitine at doses of 2 g/day for 3 months performed better on tests of memory, reasoning, and language compared with a matched control group (Tempesta et al., 1990)
- Tyrosine may be a useful adjunctive treatment in cocaine abuse (Tutton & Crayton, 1993)

Amino acids—*safety*

- Few safety problems when typically recommended doses of quality brand amino acid supplements are combined with conventional psychiatric medications (Berlanga, Ortega-Soto, Ontiveros and Senties 1992; Levitan, Shen, Jindal, Driver, Kennedy and Shapiro 2000).
- Rare cases of serotonin syndrome have been reported when L-tryptophan, 5-HTP or SAMe are used concurrently with serotonergic drugs (Turner, Loftis, Blackwell 2006; (Pancheri, P., Scapicchio, P., Chiaia, 2002).
- Safety concerns have not been reported when combining taurine or acetyl-L-carnitine with conventional psychiatric medications.

Herbal treatments of alcohol abuse: Kudzu and *Mentat*

- Kudzu (*Radix puerariae*) has been used in Chinese medicine as a treatment of alcohol abuse and dependence for almost 2000 years.
- Reduced alcohol craving is related to high plant concentrations of two isoflavones: daidzein and daidzin (Lukas S, Penetar D, Berko J et al, 2005).
- In a one-week placebo-controlled study 14 heavy drinkers pre-treated with a Kudzu (1000mg TID) versus placebo drank significantly less but did not report diminished alcohol craving
- **More studies are needed** to confirm the effect of kudzu on reducing alcohol consumption in at risk populations.

Mentat™ for relapse prevention

- Findings of a small open trial suggest that *Mentat*, ™ a proprietary Ayurvedic compound herbal formula, ***may*** reduce the risk of relapse in abstinent alcoholics (Trivedi 1999).
- ***Needs replication with controlled trial***

Ashwagandha and Ginseng

- Animal studies and human case reports suggest Ashwagandha (*Withania somnifera*) lessens severity of withdrawal from morphine (Ramarao et al, 1995; Kulkarni & Ninan, 1997).
- Ashwagandha is sedating and caution should be exercised when combined with benzodiazepines or other sedative-hypnotics.
- Ginseng (*Panax ginseng*) may reduce tolerance and dependence in chronic abuse of cocaine, methamphetamine or morphine (Kim 1990; Kim 1994; Huong 1996).

Peruvian herb for narcotic withdrawal

- *Early findings* suggest that glycosides derived from *A. discolor*, a plant used in traditional Peruvian medicine, reduce withdrawal symptoms in morphine-dependent individuals (Capasso 1998).
- ***Need replication with controlled trial***

Exercise

- Chronic alcoholics frequently experience depressed mood, which may trigger increased drinking.
- Alcoholics who exercised daily while hospitalized for medical monitoring during acute detoxification reported significant improvements in general emotional well-being (Palmer, Vacc, & Epstein, 1988).
- Abstinent alcoholics enrolled in outpatient recovery programs report improved mood with regular strength training or aerobic exercise (Palmer, Palmer, Michiels, & Thigpen, 1995; Skrede et al 2006).

Exercise—bottom line

- Because of demonstrated mental health benefits regular exercise should be ***strongly encouraged*** in all patients who abuse alcohol and drugs (ie, assuming the absence of medical problems aggrivated by physical activity).

Mindfulness training

- Mindfulness training is widely offered in drug and alcohol relapse prevention programs and probably reduces the risk of relapse (Breslin, Curtis, Zack, Martin, McMain, & Shelley, 2002).
- Two studies suggest that Transcendental meditation (TM) may be especially effective in reducing the relapse risk in abstinent alcoholics (Alexander, Robinson, & Rainforth, 1994; (Taub, Steiner, Weingarten, & Walton, 1994).
- Twelve-step programs that emphasize a ***particular religious or spiritual philosophy may*** be more effective than “spiritually neutral” programs (Muffler, Langrod, & Larson, 1991).

Virtual reality graded exposure therapy (VRGET)

- VRGET clinical applications include PTSD, phobias, eating disorders, cognitive rehabilitation following stroke, and substance abuse and dependence.
- VRGET protocols stimulating drug or alcohol craving are coupled with response prevention and desensitization.
- Regular VRGET sessions diminish nicotine or illicit drug craving in real life situations expected to trigger craving.

VGRET for nicotine craving

- 20 nicotine-dependent adults not taking conventional anti-craving medications were exposed to virtual smoking cues resulting in increased nicotine craving and physiologic indicators of craving including elevated pulse and respiration rate (Bordnick 2004) .
- Subjects exposed to *neutral* VR stimuli in the sham arm did not report increased nicotine craving.

Future VR tools

- Other VR environments are being developed to stimulate alcohol or marijuana craving.
- Future VR tools will be combined with cognitive therapy strategies aimed at response prevention and desensitization to real life situations that would be expected to stimulate craving or drug-seeking behavior.
- Future VR tools will use increasingly realistic virtual cues with the goal of desensitizing alcoholics and drug abusers to environments expected to stimulate craving or drug-using behavior.
- A *virtual crack house* is currently under development at the University of Georgia.

Cranioelectrotherapy stimulation (CES)

- CES involves the application of weak electrical current to specific points on the scalp or ears.
- In a 7-year prospective study of CES in the treatment of alcohol, drug, and nicotine addiction, acute and chronic withdrawal symptoms were diminished, normal sleep patterns were restored more rapidly, and more patients remained addiction-free following regular CES treatments compared with conventional medication management.

CES (2)

- CES-treated patients reported significantly fewer anxiety symptoms and higher quality of life measures compared with patients who underwent conventional drug treatments (Patterson, Firth, & Gardiner, 1984).
- Protocols that use daily CES treatments compare favorably with combined psychotherapy, relaxation training and biofeedback for reducing anxiety in patients abusing any substance (Overcash & Siebenthall, 1989).

CES (3)

- Daily 30-minute CES treatments significantly improve cognitive functioning and reduce measures of stress and anxiety in inpatient alcoholics or poly-substance abusers (Schmitt, Capo, & Boyd, 1986).
- In a 4-week double-blind study, 20 depressed alcoholics randomized to daily CES treatments (70 to 80 Hz, 4 to 7 mA), versus sham treatments reported significantly reduced anxiety by the end of the study.

CES—bottom line

- CES may be a reasonable alternative treatment of anxiety in withdrawing alcoholics or substance abusers while avoiding the risks of cross-tolerance and dependence associated with benzodiazepine use in this population (Krupitsky, Burakov, Karandashova, 1991).

EEG and EMG biofeedback training

- Limited data suggest that EMG and thermal biofeedback (Sharp 1997) as well as EEG biofeedback training may reduce relapse risk in abstinent alcoholics (Peniston 1989; Peniston 1990).
- In EEG biofeedback training the patient learns how to self-induce brain states corresponding to deep relaxation.
- Case studies ***suggest*** that EEG biofeedback using an alpha-theta entrainment protocol reduces relapse risk in abstinent alcoholics (Schneider 1993), but ***not in abstinent cocaine abusers*** (Richard 1995).

Dim morning light

- Early morning exposure to dim light (ie, narrow-spectrum light with an intensity of 250 lux) improves depressed mood in abstinent alcoholics diagnosed with Seasonal Affective Disorder (Avery 1998).
- Depressed mood is an established risk factor for alcohol relapse, and ***mood enhancing effects of early morning dim light may reduce relapse risk in abstinent alcoholics with SAD.***
- Findings are preliminary. More research is needed.

Acupuncture for reducing alcohol craving

- Regular acupuncture treatments increase brain levels of endogenous opioid peptides (Cheng, Pomeranz, & Yu, 1980; Clement-Jones, McLoughlin, Lowry, Besser, Rees, & Wen, 1979.
- Stimulating specific acupuncture points on the ears, hands, and the back of the neck may reduce alcohol craving and decrease withdrawal symptoms in alcoholics however acupuncture probably does *not* reduce craving and relapse after treatment is discontinued (Konefal, Duncan, & Clemence, 1994; Richard, Montoya, Nelson, & Spence, 1995).

Acupuncture for relapse prevention in abstinent alcoholics

- Findings are inconsistent for acupuncture in relapse prevention in abstinent alcoholics possibly reflecting different treatment protocols (i.e., conventional vs. electroacupuncture), differences in frequency or duration of treatment, and the skill level or specialized training of practitioners.
- In one sham-controlled study, alcoholics reported significant reductions in withdrawal symptoms within hours of the initial treatment and no withdrawal symptoms within 72 hours of the second acupuncture treatment (Yankovskis, Beldava, & Livina, 2000).

Acupuncture for alcohol craving and relapse prevention

- Another sham controlled study showed no benefit of acupuncture re reduced craving or relapse risk in alcoholics (Worner, Zeller, Schwartz, Zwas, & Lyon, 1992).
- ***However***.....some evidence that specific acupuncture protocols significantly reduced alcohol craving and reduced relapse risk in recovering alcoholics (Bullock, Culliton, & Olander, 1989; Bullock, Umen, Culliton, & Olander, 1987).

Acupuncture for smoking cessation and nicotine withdrawal

- Most controlled trials on smoking are negative or equivocal but acupuncture is widely used in the U.S. and western Europe to facilitate smoking cessation and lessen symptoms of nicotine withdrawal.
- Initial open trials of acupuncture for smoking cessation were very promising (Fuller, 1982)
- Recent sham-controlled trials were equivocal. No significant differences in severity of withdrawal symptoms in nicotine-dependent patients given accepted electroacupuncture protocol versus sham (White, Resch, & Ernst, 1998).

Auricular acupuncture for nicotine craving and smoking cessation

- High school student smokers randomized to weekly auricular acupuncture treatments using well defined protocol for reducing smoking versus a non-specific protocol.
- By 4-weeks only one student had stopped smoking and there no significant differences in nicotine craving however students who completed the smoking cessation protocol smoked fewer cigarettes per day compared to the sham group (Kang, Shin, Kim & Youn, 2005).

Acupuncture for smoking cessation and nicotine withdrawal

- A Cochrane systematic review and meta-analysis of 22 sham-controlled studies and more than 2,000 patients on the efficacy of acupuncture for smoking cessation, found no evidence for therapeutic acupuncture for smoking cessation.
- Sham-controlled studies on conventional acupuncture, acupressure, electroacupuncture, and laser acupuncture were included in the meta-analysis (White, Rampes, & Ernst, 2004).

Acupuncture for smoking cessation—bottom line

- Longer and larger sham-controlled studies are needed to determine both the optimum protocol, frequency, duration and type of acupuncture treatment for smoking cessation.

Acupuncture for nicotine withdrawal and cocaine addiction

- A Cochrane systematic review and a separate independent review concluded that both conventional acupuncture and electroacupuncture are ***equally ineffective*** in reducing symptoms of nicotine withdrawal and controlling cocaine addiction (D'Alberto, 2004; White,1996).
- *However*....***cocaine abusers frequently report subjective calming and diminished craving*** after only one or two acupuncture treatments, and this effect is sustained with repeated treatments.
- ***More studies needed***

Acupuncture for cocaine addiction

- 8-week placebo-controlled study comparing acupuncture with conventional drug therapies in cocaine addicts on methadone maintenance therapy 50% dropped out, but **90% of those who completed the study achieved abstinence following 8 weeks of treatment** (Margolin, Avants, chang, & Posten, 1993).
- Patients who achieved abstinence reported diminished narcotics craving and improved mood (White 1996)

Auricular acupuncture for cocaine addiction

- Three auricular acupuncture protocols widely used for relapse prevention in cocaine abusers were ***equally effective*** in reducing craving regardless of protocol (Konefal, Duncan, & Clemence, 1995).
- Beneficial outcomes may result from a ***general effect*** –more studies needed

Qigong and heroin addiction

- Findings of sham-controlled trials suggest that external qigong treatments reduce the severity of withdrawal symptoms in heroin addicts (Li 2002).
- Animal studies suggest that external qigong applied to morphine-dependent mice lessens the behavioral symptoms of withdrawal following pharmacological blockade of morphine at the level of brain receptors (Zhixian 2003).

Qigong in management of narcotics withdrawal

- Regular qigong treatments may provide a useful adjunct to conventional pharmacological and behavioral management of detoxification and withdrawal from heroin and other opiates.
- The ***unskillful practice of qigong can potentially result in agitation or psychosis***.
- Addicts interested in qigong should work with a ***skilled qigong instructor or medical qigong therapist***.