

ALCOHOLISM AND IT'S TREATMENT – A REVIEW

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Alcoholism is a primary, chronic disease with genetic psychological and environmental factors influencing its development. Absorption of alcohol begins in stomach within 5-10 minutes of oral ingestion. Primarily alcohol is absorbed from duodenum, but in small amounts from stomach, oesophagus and mucous membranes. Over 90% of alcohol in plasma is metabolised in liver by three enzyme systems within hepatocytes. Alcohol is a CNS depressant that shares many pharmacological properties with non –benzodiazepines sedative- hypnotic drugs. It affects the CNS in dose dependant fashion, producing sedation that progresses to sleep, unconsciousness. Diazepam and chlordiazepoxide are facilitating the action of GABA in CNS, although they have the potential of abuse because of reinforcing effects. Although barbiturates are used in detoxification of withdrawal symptoms but they have low abuse symptoms. Herbs have been used traditionally to treat alcoholism. An ayurvedic formula SKV – An herbal formulation (contains 1 – 2 % ethanol) obtained by fermentation of cane sugar with resins and 12 herbal ingredients brings down voluntary ethanol ingestion and increases food intake.

Alcohol creates a physical dependence in the drinker, and withdrawal can be life threatening. So when an alcoholic is being withdrawn from alcohol, medication may be necessary in consult with physician and pharmacist. The most important part of the treatment for a alcoholic person is to admit in rehabilitation centre and to stop drinking completely. Stopping of drinking is very difficult for a person with alcoholism without help of the friends, family members as well as support groups such as *Alcoholics Anonymous*.

Keywords :

INTRODUCTION

Alcoholism is a primary, chronic disease with genetic psychological and environmental factors influencing its development.¹ Alcohol abuse means drinking more alcohol than is socially, psychologically or physically acceptable. Alcoholism is a more serious condition characterised by both physical and psychological dependence. It damages the sufferer's health, social and family life and career. Safe level of drinking for men is less than 21 units/ week and for women is less than 14 units/ week (1 unit = 237 ml. of 3% beer ; 8 gms. of beer).² Alcoholism is heritable as 50% -60% of first degree relatives of alcoholics becomes alcohol dependence. Although there are some factors that are believed to precipitate alcohol dependence. These are summarised in Table-1.³

PHARMACOKINETICS

Absorption of alcohol begins in stomach within 5-10 minutes of oral ingestion. Primarily alcohol is absorbed from duodenum, but in small amounts from stomach, esophagus and mucous membranes. Over 90% of alcohol in plasma is metabolised in liver by three enzyme systems within hepatocytes as shown in Fig.1. Remaining is excreted by lungs, urine and sweat. Metabolism of alcohol follows zero kinetics and volume of distribution is 0.6 – 0.8 L/kg³ An increase in alcohol oxidation is observed in chronic alcoholics due to induction of microsomal ethanol

oxidation activity. About 10 ml/ hr. of alcohol is oxidised in liver. The acetate formed enters the kreb's cycle producing 7 kcal/ gm. of ethanol.⁴ Table-1, Fig.1.

PHARMACOLOGY

Alcohol as drug

Alcohol is a CNS depressant that shares many pharmacological properties with non –benzodiazepines sedative- hypnotic drugs. It affects the CNS in dose dependant fashion, producing sedation that progresses to sleep, unconsciousness, coma, surgical anaesthesia, respiratory depression and cardiovascular collapse.

Alcohol intake results in an increase in endogenous opioids and this is responsible for euphoria on alcohol assumption. Currently there are no clinically useful antagonists that reverse the pharmacologic effects of alcohol.³

Lethal dose of alcohol in humans is variable, but death occurs when blood levels are 400-700 mg/dl. The typical effects of various blood concentrations of alcohol on body are shown in table 2.²

Effect of alcoholism on body

Chronic alcohol ingestion leads to pancreatitis, gastritis, malnutrition, and cirrhosis of the liver. Excessive ingestion of alcohol produces hypertension, high fat levels in the blood, rhythm disturbances and congestive heart failure. On brain, chronic alcohol ingestion produces depression,

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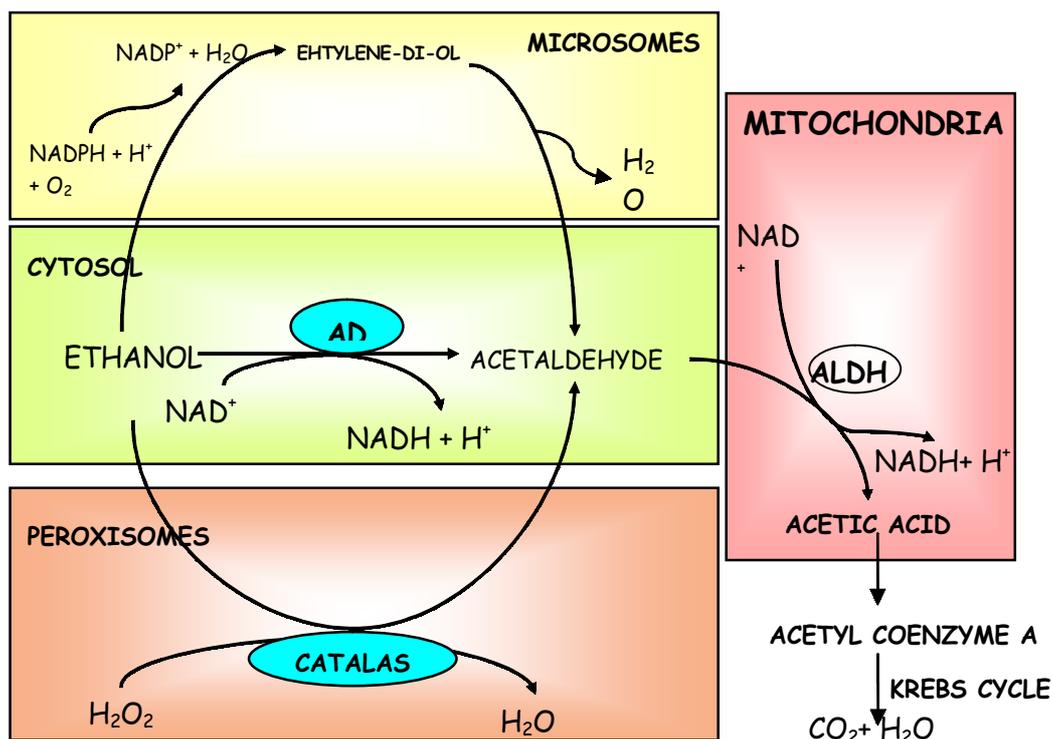


FIGURE 1. Metabolism of Alcohol.

TABLE – 1 Factors affecting alcohol dependence

Susceptibility genes	Phenotype	Environment
Regions on chromosomes 1 and 4 that code for the following receptors: <ul style="list-style-type: none"> • <i>GABA Serotonin 1b DRD4 (Dopamin 2), Tryptophan, Hydroxylase, Neuropeptide Y.</i> • <i>Gene that code for ALDH 2 on chromosome 12, 5HTTLPR (Serotonin Transporters Promoter)</i> 	Personality traits that includes: <ul style="list-style-type: none"> • <i>Novelty seeking</i> • <i>Impulsivity</i> • <i>Aggression</i> • <i>Depression</i> • <i>Max. no. of alcoholics drinks consumed per day</i> 	<ul style="list-style-type: none"> • <i>Religious background</i> • <i>Urban Vs. rural residence</i> • <i>History of sexual abuse</i> • <i>Being single</i> • <i>Having deceased patients</i>

memory loss, emotional and sleeps disorders. Prolonged alcohol consumption leads to impotence and sterility. Alcohol impair psychomotor performance and blunt reflex motor activity. Chronic alcohol ingestion increases the risk of hepatic, pancreatic and oesophageal cancer and can lead to foetal alcohol syndrome during pregnancy, hence is teratogenic². The mechanism of various disease caused by ethanol abuse in shown in Table-3.¹

Effect of alcoholism on drug therapy

Alcohol interacts with more than 150 medications and produces serious liver damage with painkiller acetaminophen. It also decreases effectiveness of anticonvulsants. It is believed to increase drowsiness with antihistamines. It decreases the action of antidepressants. Due to decreased absorption of nutrition there occurs decreased utilisation of most vitamins. It also enhances

Table – 2: Effect of various blood concentrations of alcohol on body

Blood Ethanol, mg/dl	Clinical Effect
20-99	Slight changes in mood, feelings, muscular in coordination, talkative
100-199	Mental impairment, in coordination , unsteadiness in standing and walking
200-299	Nausea vomiting, ataxia
300-399	Hypothermia, stage I anaesthesia
400-700	Coma, respiratory failure, death

the metabolism of anticoagulants hence diminishes there effect. It reduce the effect of caffeine when taken in chronic case.¹

TREATMENT

Alcohol Related Disorders

Definition of alcohol withdrawal includes two main components,

1. History of cessation or reduction in heavy and prolonged alcohol usage.
2. Presence of two or more of the symptoms of alcohol withdrawal.³

Sign and symptoms of alcohol withdrawal and acute alcohol intoxicification include,

Intoxification

Slurred speech, ataxia, nystagmsis, sedation, flushed face, mood change, irritability, euphoria, impaired attention.

Withdrawal

Tremors, tachycardia, diaphoresis,, labile B.P, anxiety, nausea & vomiting, hallucinations, seizures, hyperthermia, delirium.¹

There are certain goals established for alcohol dependent persons trying to decrease or discontinue alcohol intake.

1. Prevention and treatment of withdrawal symptoms (including seizures and delirium tremors) and medical or psychiatric complications

Table - 3 Mechanisms of Disease Caused by Ethanol Abuse

Organ system	Lesion	Mechanism
Liver	Fatty change, acute hepatitis, alcohol cirrhosis	Toxicity
CNS	Wernicke syndrome Korsakoff syndrome Cereberallar degeneration Peripheral neuropathy	Thiamine deficiency, toxicity
CVS	Cardiomyopathy Hypertension	Toxicity, Vasopressor
Gastrointestinal tract	Gastritis, pancreatic	Toxicity, toxicity
Skeletal muscle	Rhabdomyolysis	Toxicity
Reproductive system	Testicular atropy	
Fata alcohol syndrome	Growth retardation Mental retardation Birth defects	Toxicity

2. Long term abstinence after detoxification.
3. Entry into ongoing medical and alcohol dependence treatment.³

ALLOPATHIC TREATMENT

To treat withdrawal symptoms

Benzodiazepine and other drugs: They are best controlled by diazepam and chlordiazepoxide and facilitate the action of GABA in CNS, although they have the potential of abuse because of reinforcing effects. Although barbiturates are used in detoxification of withdrawal symptoms but they have low abuse symptoms.³ It is long acting and can be administered by oral, i.m., i.v. route and has well documented anticonvulsant activity.³ But barbiturates pose a greater risk of respiratory depression when combined with alcohol.

To help maintain abstinence

1. *Disulfiram* : Blocks metabolism of ethanol at acetaldehyde stage and thus precipitates disulfiram like reaction. It is given singly oral in doses of 500mg. for 2-3 wks., with maintenance dose of 125-500 mg/day.

TABLE- 4 Detailed information of allopathic treatment

Drug	Therapeutic uses	Adverse rxns.	Drug interations	Contraindication-
Benzodiazepine	In management of acute alcohol withdrawal symptoms	Nausea, vomiting, hypotension	Enhances the CNS depressant effect of alcohol & antihistamine	Liver disease
Naltrexone + psycosocial therapy ⁸	To reduce desire to drink (anticraving)	Nausea, headache, constipation	Increases hepatotoxicity with disulfiram	Pregnancy, hepatitis
Disulfiram	In chronic alcoholism	Headache, restlessness, psychosis, optic neuritis.	Potentiates effects of diazepam & phenytoin	Psychosis, pregnancy, myocardial disease.

2. Naltrexone : Its combination with psychosocial therapy reduces alcohol craving and decreases the rate relapses. It is given 50mg. once a day.

To treat pre : exiting anxiety or depression

Antidepressants : they are used endogenous and for suicidal tendencies. The newer ones have a lower potential for acute toxicity and may represent less risk to a recovering alcoholic.

Lithium : Lithium may prevent the progress primary alcoholism. Lithium therapy may support the recovery and might affect the course of alcoholism.

The treatment regime

It includes fixed : scheduled therapy, front loading, and symptom- triggered therapy.³

Fixed scheduled therapy : In this regime chlodiazep oxide 50-100 mg. is given orally every 6 hrs. for 1day followed by 2 days at 25-50 mg. every 6 hrs. this prevent delirium tremors and seizures.

Front loading : In this regime frequent high dosing of medication is given to treat the early signs and symptoms of withdrawal. Diazepam is given in 20 mg. doses every 2 hrs. until resolution of withdrawal symptom is observed. In this regime decreased incidence of withdrawal is observed and intensive monitoring is limited.

Symptom Triggered Therapy: Administered on precipitation of symptoms. It has shorter treatment. Detailed information of allopathic treatment is given in Table 4.¹⁻⁴ Some newer drugs includes *nalmefene* which give no dose dependant liver toxicity, has greater oral bioavailability, have longer duration of antagonistic action, binds competitively with opiod receptors(that reinforce drinking). *Acamprostate*, a 5-HT₃ antagonist decreases drinking frequency and enhances abstinence. Another drug *Topiramate*, a fructopyranose derivative controls seizures and prevent alcoholic relapse.⁵

HERBAL TREATMENT

Herbs have been used traditionally to treat alcoholism. An ayurvedic formula SKV—An herbal formulation (contains 1–2 % ethanol) obtained by fermentation of cane sugar with resins and 12 herbal ingredients brings down voluntary ethanol ingestion and increases food intake.²

The herbs, *Silybium marimum*, are used three times a day, to support liver. The root of *Taraxacum officinale* root three times a day in tea helps to detoxify the liver, *Pueraria lobata* reduces craving by increasing fluid production by body and *Scutellaria laterifolia* is used for hysteria, tension and nervous disorders.²

Homeopathic treatment

Various drugs used to treat alcoholism are Anticrud, Carboveg, Coffia, Lach, Arsenic, Sulphur, Causticum, Nux vomica (for treating hangover effect). it is required not to take anything 15 min. before or after drug administration. Capsicum is usually taken for stomach pain after heavy drinking. *Arsenicum album* is taken for anxiety and compulsiveness with nausea, vomiting and diarrhoea.²

Acupuncture treatment

Treatment is based on excess or deficiency of vital energy circulating in body (qi)

In liver qi deficiency is observed in case of alcoholism while in gall bladder excess qi is observed in alcoholism. The various modes of treatment include needling treatment and moxibustion i.e powdered leaf of *Artemisia vulgaris* is burned over specific acupuncture points.²

Behavioural therapies

A new study examines the effectiveness of combining communications, cue exposure and coping skills training with naltrexone in the treatment program. The behavioural therapies provide day hospital treatment along with pharmacotherapy after discharge when the patient had brief contact with physician for 12 wks.

These include

Motivational enhancement therapy includes exploring the benefits of abstinence; review treatment options and design plan to implement treatment goals.

Couples therapy or **behavioural marital therapy** improves patient condition by strengthening marital relationships through shared activities and teaching communication and conflict evaluation skills.

CONCLUSION

Alcohol creates a physical dependence in the drinker, and withdrawal can be life threatening. So when an alcoholic is being withdrawn from alcohol, medication may be necessary in consult with physician and pharmacist. The most important part of the treatment for a alcoholic person is to admit in rehabilitation centre and to stop drinking completely. Stopping of drinking is very difficult for a person with alcoholism without help of the friends, family members as well as support groups such as *Alcoholics Anonymous*.

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