Review Article

A CRITICAL REVIEW ON ALCOHOLISM WITH SPECIAL REFERENCE TO MADATYAYA

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Article Received on: 18/10/18 Accepted on: 22/11/18

DOI: 10.7897/2321-6328.06698

ABSTRACT

The word Alcohol comes from an Arabic word ‘Algwl’ or ‘al kuhl’ meaning Body Eating Spirit (Liquors being called Spirits in English) or demons akin to. The Arabic word “Alcohol” means to redden the eyes. Alcohol is the most commonly used and widely abused psycho active drug in the world. Brewing of alcohol dates back to the beginning of civilization. The discovery of late Stone Age, bearing jugs depicting wine glasses have established the fact that fermented beverages existed as early as the neo-lithic period (10000 B.C.). Alcoholism is the disease which is chronic, progressive and fatal if not treated. More than 100000 deaths are caused all over world by excessive alcohol consumption every year. Direct and indirect causes of death include drunken driving, cirrhosis of liver, traumatic injuries, cancer and stroke.

KEY WORDS: Alcoholism, Alcohol, Liquor, Madatyaya, Mad, Madya.

INTRODUCTION

India is one of the largest producer of alcohol in the world and the dominant producer in South East Asia with 65% of total share. Alcohol is a depressant drug that slows down the activity of the brain and contains absolutely no nutrients1. It doesn’t relieve tension nor induces sleep or solve problems. Alcohol is an inebriant poison that intoxicates i.e. light headedness, produces mental confusion, headache, disorientation and drowsiness2. Alcohol is an organic compound in which hydroxyl group (-OH) is bound to carbon atom of an alkyl. All alcoholic beverages contain the same mood changing agent - ethyl alcohol though in varying percentage.

The term alcohol usually refers to ethyl alcohol or ethanol (C₂H₅OH). Ethanol is also known as Grain alcohol. It is a clear, transparent, colourless, volatile liquid with a faint fruity odour and sweetish burning taste. It is a depressant and an anaesthetic and leads our brain to sleep starting with outer cortex which is a part of the brain that differentiate human beings animals and gives the ability of thinking and reasoning4. It is toxic by oral, inhalation, subcutaneous, intravenous, intra-arterial, intraperitoneal and dermal routes.

After oral administration, 20% of ethanol is rapidly absorbed from the stomach and 80% from the small intestine. Peak alcohol concentration in blood is reached in 30 to 90 minutes following the last drink. Many factors can delay absorption such as undiluted ethanol (by provoking pylorospasm), presence of food, delayed gastric emptying due to any cause and presence of congeners in alcohol6.

Rapid absorption of vaporized ethanol can be attained by inhalation, leading to intoxication. From an equivalent dose of ethanol, women achieve a higher blood alcohol level than do men as a result of decreased gastric alcohol dehydrogenase activity7. Liver damage occurs more in women as compared to men after consumption of alcohol. 90% of ingested ethanol is metabolized in the body and only 5-10% is excreted unchanged by the kidneys, lungs, and sweat8. In adults, the average rate of ethanol metabolism is 100 to 125 mg/kg/hr in occasional drinkers, and up to 175 mg/kg/hr in habitual drinkers. The blood alcohol level generally falls at a rate of 15 to 20 mg/100 ml/hr. This may be higher (up to 30 mg/100 ml/hr) in chronic alcoholics.

Table 1: ETHANOL CONTENT (% BY VOLUME) IN DIFFERENT BEVERAGES9

<table>
<thead>
<tr>
<th>Beverages</th>
<th>Ethanol content (% by volume)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light beer</td>
<td>4-6 %</td>
</tr>
<tr>
<td>Heavy beer</td>
<td>6-8 %</td>
</tr>
<tr>
<td>Natural wine</td>
<td>10-15 %</td>
</tr>
<tr>
<td>Fortified wine</td>
<td>15-20 %</td>
</tr>
<tr>
<td>Whisky, gin, brandy</td>
<td>40-45 %</td>
</tr>
<tr>
<td>Rum</td>
<td>50%</td>
</tr>
</tbody>
</table>

USES10

Beverage- The most common alcoholic beverages include beer, wine, whisky, gin, brandy, rum, and vodka (Table no. 01). In addition, there are several indigenous preparations peculiar to particular regions such as arrack, toddy and fenny in India, tequila in Mexico, sake in Japan, eau de vie or fruit brandy in France.

Solvent-Alcohol is used as solvent for spray, after-shaves, colognes, mouthwashes and perfumes. The alcohol content in these are variable about 15 to 80 %.

Medicinal and therapeutic- Several multi vitamin, decongestant, antihistaminic and cough syrups contain varying percentage of alcohol (2 to 25 %). Ethanol has been popular in the past as an antiseptic. Surgical spirit used even today is mostly ethanol (90 to 95 %) with a small quantity of methanol (5 to 10 %) along with...
traces of castor oil and methyl salicylates. Ethanol sponging is an effective remedy for hyperthermia.

Injection of dehydrated alcohol (absolute alcohol) in close proximity of nerves or sympathetic ganglia is said to be effective for the relief of long-lasting pain in conditions such as trigeminal neuralgia.

Antidote- It is used as an antidote for methanol poisoning and ethylene glycol poisoning.

Preservative-Rectified spirit (90 to 95% ethanol) is used as a preservative for viscera, for chemical analysis.

Fuel- Ethanol is used to extract nucleic acids from whole tissue or tissue culture in virtually all biotechnology processes.

### Table 2: MODE OF ACTION OF ALCOHOL\(^{13}\)

<table>
<thead>
<tr>
<th>CNS</th>
<th>CVS</th>
<th>GIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Initially stimulation effect</td>
<td>1. Tachycardia</td>
<td>1. Stimulates salivation</td>
</tr>
<tr>
<td>2. Depressant</td>
<td>2. Vasodilatation of cutaneous vessels</td>
<td>2. Increased mucous secretions</td>
</tr>
<tr>
<td>3. Affects memory concentration</td>
<td>3. Warm and flushed skin</td>
<td>3. Congested mucosa</td>
</tr>
<tr>
<td>and insight</td>
<td></td>
<td>4. Erosive gastritis</td>
</tr>
<tr>
<td>4. Mood Swing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Sensory and motor disturbances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. CNS Impairment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3: CLINICAL FEATURES OF ACUTE ALCOHOL POISONING\(^{12}\)

<table>
<thead>
<tr>
<th>Stage of Well Being</th>
<th>Stage of Confusion</th>
<th>Stage of Coma</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flushing of face</td>
<td>1. In coordination</td>
<td>1. Slow breathing</td>
</tr>
<tr>
<td>7. Incoordination</td>
<td>7. Semi consciousness</td>
<td>7. Death due to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A. Depression of higher centres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B. Acute central anoxia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C. Pneumonia or pulmonary death</td>
</tr>
</tbody>
</table>

### Table 4: FEATURES OF ALCOHOL POISONING ACCORDING TO BLOOD ALCOHOL CONCENTRATION\(^{13}\)

<table>
<thead>
<tr>
<th>Blood alcohol concentration (mg/100ml)</th>
<th>Stage of intoxication</th>
<th>Clinical features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-50</td>
<td>Sorniety (Decent)</td>
<td>Near normal behaviour</td>
</tr>
<tr>
<td>50-100</td>
<td>Euphoria (Delighted)</td>
<td>Feeling of wellbeing, Talkativeness, Increased self-confidence, fine movements affected</td>
</tr>
<tr>
<td>100-150</td>
<td>Excitement (Delirious)</td>
<td>Emotional instability, Impaired memory, Increased reaction time, Mild ataxia</td>
</tr>
<tr>
<td>150-200</td>
<td>Confusion (Dazed)</td>
<td>Disorientation, Confusion, Vertigo, ataxia, slurred speech</td>
</tr>
<tr>
<td>200-300</td>
<td>Stupor (Dejected)</td>
<td>General inertia, Diminished response to stimuli, inability to stand and walk, vomiting</td>
</tr>
<tr>
<td>300-500</td>
<td>Coma (Dead drunk)</td>
<td>Unconsciousness, Abolished reflexes, Subnormal temperature, Incontinence, Respiratory compromise</td>
</tr>
<tr>
<td>&gt;500</td>
<td>Death (Dead)</td>
<td>Death due to respiratory failure</td>
</tr>
</tbody>
</table>

### Diagnosis

Blood alcohol concentration (BAC) is estimated by microdiffusion or electro chemical techniques. The latter is a rapid quantitative list and is done in casualty department. There is another technique known as immunoassay or gas chromatography which is commonly employed in Indian laboratories\(^{14}\). Though the result is accurate, they are often delayed several hours and are not really appropriate in the clinical scenario.

### ACUTE & CHRONIC ALCOHOL POISONING\(^{15}\)

Acute Alcohol Poisoning

It is a medical term used to indicate a dangerously high concentration of alcohol in the blood, high enough to induce coma, respiratory depression or even death.

### Chronic Alcohol Poisoning

It is a condition in an individual which is a result due to consumption of large amounts of alcohol over longer period usually seen in habitual drunkards. It is characterized by.

Anorexia, vomiting, nutritional deficiency and pathological desire for alcohol intake can occur.

Alcoholic cirrhosis of liver, black out during intoxication, impaired mental functions, neurological damages; cardiomyopathy and skeletal myopathy may also develop.

Withdrawal symptoms on ceasing the intake

### THE PATH OF ALCOHOL IN THE BODY\(^{16}\)

**Mouth:** Alcohol enters the body.

**Stomach:** Some Alcohol gets into the bloodstream in the stomach, but most goes on to the small intestine.
Small Intestine: Alcohol enters the bloodstream through the walls of the small intestine.
Heart: Pumps Alcohol throughout the body.
Brain: Alcohol reaches the brain.
Liver: Alcohol is oxidized by the liver at a rate of about 0.2 oz per hour. Alcohol is converted into water, carbon dioxide and energy.

FATAL DOSE
Fatal dose in adult is 6 gm of ethanol / kg body weight (adults) and in children it is 3 gm / kg body weight.
Levels of blood alcohol above 500mg /100 ml of blood.

FATAL PERIOD
Usually 12 to 24 hours
Rarely 5 to 6 days

TREATMENT
Secure airway
Ventilatory support
Stomach wash
Maintain adequate blood pressure and circulation.
Thiamine 100mg IV
50-100ml of dextrose IV
I.V. fluids

ALCOHOL WITHDRAWAL SYNDROME
Sudden cessation of alcohol by such person results in withdrawal reaction which may manifest as:
Abstinence syndrome develops 6 to 8 hours after cessation of alcohol: Characterised by tremors affecting hands and legs, agitation, sweating, nausea, vomiting, headache and insomnia.

STAGES OF MADATYAYA

<table>
<thead>
<tr>
<th>PRATHAMA AVASTHA</th>
<th>DWITIYA AVASTHA</th>
<th>TRITIYA AVASTHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulation of energy</td>
<td>Mental confusion</td>
<td>Losing consciousness</td>
</tr>
<tr>
<td>Joys moods and spirit</td>
<td>Excessive confusion</td>
<td>Motion loss</td>
</tr>
<tr>
<td>Interest in music</td>
<td>Incoherent Movement</td>
<td>Confusion</td>
</tr>
<tr>
<td>Increased sexual urge</td>
<td>Irrational Acts</td>
<td>Loss of discriminative power</td>
</tr>
<tr>
<td>Interest in foods and drinks, Sound sleep</td>
<td>Drowsy and Lethargy</td>
<td></td>
</tr>
</tbody>
</table>

CLINICAL CONDITIONS MANIFESTED DUE TO INTAKE OF MADAYA

Panaatyayam paramade panajirnathaa api va panaavibramugram cha tesham vakshyami lakshanam (Ma.Pri.18/15)
According to Madhava Nidana, mainly four Clinical conditions arise due to improper consumption of madya. They are Panatyaya, Paramada, Panajirna and Pana Vibhrama.

MADATYAYA (PANATYAYA) GENERAL FEATURES

samanyam lakshanam tesham pramehohourdayavasthaa.
vidbeada santataatrishnaasaumyajwaro aruchi.
siraparsavaasthirukkampo marmabedhatrikagraha.
urowibandhamitaram kasaaswasaprajagara.
swedo atimatramvishthamba swayathuchitavigrama.
pralapaswarakshadhirutklesho bramodukhapradarsanam. (A.S.Ni 6/15/27)

PANANTYAYA

The Vataja type of Panatyaya is marked by such symptoms like numbness and aching pain in the limbs, palpitation, a catching and prickling pain in the region of the heart and headache.

Alcohol hallucinations appear 24 to 36 hours after cessation of alcohol: Characterised by agitation, insomnia, and convulsions (seizures syndrome).
Rum fits occur 7 to 48 hours after cessation of alcohol: Characterised by tremor, hallucinations, clonic-tonic movements, with or without loss of consciousness.
Delirium tremens appears after 3 to 5 days after cessation of alcohol: Characterised by delirium tremens-Onset of disordered mental activity, clouding of consciousness, disorientation with loss of recent memory and hallucinations.

MADATYAYA

Madya is the alcoholic end product of Sandhana Kalpana (Ayurvedic biomedical fermented formulations). It possesses excessive Tamo Guna (literally means darkness) and causes derangement of mind. Madatyaya is very well described in Ayurvedic classics.

Buddhi lumpati yat drayam madakaari taduchyate tamoguna pradhanan cha yathya madya suradhikam (Sa.Sm.Pra.4/21-22)
Acharya Sharangdharma while describing the madakari properties has included all the drugs with tamoguna (darkness-one among mahagunas) and which causes derangement of mind under Madya varga. It has 10 properties almost similar to that of poison.

MODE OF ACTION
According to Sharangdharma Samhita, the substance which effects on brain and mind after indigestion is called as madya.
According to Bhava Prakasha, the liquid which produce narcotic effect on man after drinking is called as madya.

PERSPIRATION, delirium, dryness of the mouth, burning sensation and fainting, fits and yellowness of the face and eyes are the features which distinguish the Pittaja type of Panatyaya. Vomiting, shivering and salivation are the indications which mark the Kaphaja type of Panatyaya. The symptoms of all the three types being exhibited in the one form, due to the concerted action of the three deranged bodily Doshas (the main three Ayurvedic fundamental constitutions of the body) is called Tri-Doshaja or Sannipataja type of Panatyaya.

PARAMADA (HANGOVER)

ushnam anagunuvitam virsanvantam sleshmaadhidhikata
ruchimalpa mutrasangam
lingam parasya tu madasya vadanti tattayatrina rujasirasi chapi bhedam. (Su.U.47/19-20)

Heat and a sense of heaviness in the body, bad taste in the mouth, excessive accumulation of Sleshma in the body, an aversion to food, suppression of stool and urine, thirst, headache and a crushing pain in the joints are the symptoms which the learned physician sets down to Paramada (reactionary effects of the abuse of wine).
PANA VIHARAM

hridgratodah amyathujwara karta dhumamoorchha kaphasravana murdhuru vidaha.
dwesha suranna vikriteshu cha teshu tam
panivibramusathakhilena dheera. (Su.U.47/21-22)

Aggravation of the deranged Pitta should be regarded by a physician as the exciting factor of the disease. The malady which exhibits such symptoms as piercing pain in the heart and limbs, vomiting, fever, a sensation of the rising of fumes into the throat, salivation, epileptic fits, headache, a burning sensation in the throat and an aversion to all sorts of food and wine (in connection with an abuse of wine) is called Pana Viharama.

TREATMENT

It is two types:

Samanya Chikitsa (General Treatment) and Visheshya Chikitsa (Specific Treatment)

SAMANYA CHIKITSA (GENERAL TREATMENT)

All the varieties of alcoholism are tridoshaja type with one particular dosha dominating the other two. Hence in the treatment of alcoholism, the predominant dosha is treated first, otherwise the kapha dosha should be treated first as it dominates vata and pitta in majority of cases.

Madya Prayoga

The clinical condition which arises from inadequate, improper or excessive drinking of liquor is treated by giving variety of liquor in proper dose and method. Because of its natural properties of quick absorption, sharpness and hotness, the Madya (alcohol) causes liquefaction of dosha and impart quick relief. It removes obstruction in channels of circulation, improves digestive fire and increases desire for food.

Dugdha Prayoga

Once the kapha dosha predominance is neutralized by Madya Prayoga (the first method of treatment), the vitiated pitta and vata are to be pacified by the administration of dugdha (milk) with its demulcent and nutritive properties. Milk alleviates all the symptoms and complication of pitta and vata. It acts as a boon just like the rains for a tree which is extremely dried in summer. Once the symptoms get subsided, milk is also withdrawn gradually and is replaced with suitable dietary supplements.

Harshana Kriya

Alcoholism apart from physical symptoms also causes agitation and derangement of mind. Hence to bring back mind to its normal state from the state of depression, Ayurvedic classic recommends certain Harshana Kriya (exhilarating methods) as a part of physiological measures like beautiful parks, good food and drinks, garlands, perfumes, entertaining parties, beloved and submissive women, ponds with lotus flowers, pleasing companion, melodious jokes, talks and songs.

VISHESHA CHIKITSA (SPECIFIC TREATMENT) OF PANATAYA

Vataja Chikitsa

Chukra, Ardraka, Maricha, Kushta, Dipya, Sauvarcha Lavana + Appropriate madya

Prithivika, hingu, dipyaka, Mahauhshadha + Sauvarcha lavana

Drinks prepared with amra, amrataka, dadima, matulung, meat soup + Matulunga rasa

Pittaja Chikitsa

Madhya + madhuradigana kashaya + honey + sugar

Concentrated ikshu rasa

Mudgasoup + sugar + ghee

Meat juice of lava, aina or tittiri bird

Kaphaja Chikitsa

Vomiting by wine + juice of bimbi and vidula

Meat soup of wild fatty animal and ikshu rasa

Mudgasoup + sugar + ghee

Meat juice of lava, Aina or tittiri bird

Sannipataja Chikitsa

All the measures which are adopted above and are appropriate to balance the predominant dosha.

DISCUSSION

India is falling into the criteria for hazardous drinking with more than half of all alcohol drinkers in the country. Alcohol abuse is emerging as a major public health problem. Alcoholism or an addiction to alcohol is often seen as a non-medical condition in our country. Alcohol use plays a role in many social activities, from the business lunch and parties to special occasions. Alcohol is an inebriant poison that intoxicates i.e., induces mental confusion, light headedness, disorientation and drowsiness. An addiction to this poison often goes out of control for a person who has a dependence on alcohol.

Drinking alcohol within a moderate quantity is fine and has a lot of positive impacts on one’s health. But when drinking alcohol begins to impact one’s life in a negative way, it might be a symptom of alcoholism. Alcoholism is defined as an illness in which the sufferer experiences a strong need for alcohol, a loss of control during limiting alcohol intake, is developing a tolerance and needs more alcohol to get the same effect and if he tries to withdraw from drinking, he sees withdrawal symptoms. When blood alcohol level reaches 0.10-0.15%, it affects the adaptability of the eyes and the ability to judge distance is reduced drastically. There is also an increase in the tendency to have an accident especially with another vehicle. Such accidents may be termed “Alcohol influenced”. After considering all these factors, we can say that excessive use of alcohol is no way good for health.

CONCLUSION

Trauma, violence, organ system damage, various cancers, unsafe sexual practices, premature death and poor nutritional status of families with heavy drinking fathers are all associated with alcohol abuse. Hazardous drinking was significantly associated with severe health problems such as head injuries and hospitalizations. 15 to 20% of traumatic brain injuries were related to alcohol use. Development of alcohol policy that addresses issues related to alcohol taxation, restrictions on production, number of sales outlets and hours of operation as well as ensuring stricter implementation of rules on age restrictions, drinking and driving laws and advertising should be implemented. Research to highlight costs of alcohol use, monitor consumption trends and generate data for advocacy efforts to build political commitment and community support to reduce
harmful impact of alcohol are to be implemented and also practiced.

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Cite this article as:
http://dx.doi.org/10.7897/2321-6328.06698

Source of support: Nil; Conflict of interest: None Declared

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