

An Overview of the Action of Homoeopathic Medicine Nux Vomica, a Variant from Loganaceae Family, on the Management of Alcoholic Liver Disease

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Abstract: *Alcoholism in excess is a problem for health care worldwide. Existing cultural and social norms that endorse drinking and mixed messages about the advantages and disadvantages of alcohol consumption, slows down relevant health-seeking behaviour. Persistent and excessive alcohol use, with poor prognosis and a high mortality rate is a major contributor to liver disease. Alcoholic liver disease is caused by excessive alcohol consumption which damages the liver and causes fat buildup, inflammation, and scarring. Homoeopathy, a holistic system of medicine is known to be of high therapeutic value in the management of liver diseases caused by alcohol consumption. Among the various medicines available in Homoeopathy, this article focuses on the effects of Homoeopathic medicine Nux vomica in the management of alcoholic liver disease highlighting its mode of action.*

Keywords: Alcoholic liver disease, Nux vomica, Homoeopathy

1. Introduction

With the gradual adoption of a western diet, sedentary behaviour, and a sense of social liberation from long-held alcohol taboos, India is undergoing a cultural and lifestyle transition that is giving rise to a diverse range of liver diseases that are rapidly on the rise. ⁽¹⁾ Being responsible for 18.3% of the two million deaths caused by liver diseases worldwide in 2015, India bears a disproportionately large burden of liver diseases. This change involves giving Alcoholic liver disease (ALD) and Non alcoholic fatty liver disease (NAFLD) a greater overall significance as causes of liver disease than viral causative factors. ⁽²⁾ Homoeopathic medicine Nux vomica is known to have diverse range of action when it comes to its therapeutic effects. It is known to have hepatoprotective action and is successful in alleviating the symptoms of excessive alcohol and other drug use.

Alcoholic Liver Disease

Worldwide, Alcoholic liver disease is the most common form of chronic liver disease. Alcoholic liver disease encompasses a wide range of liver injuries starting from steatosis with minimal parenchymal damage, progressing to steatohepatitis, fibrosis, cirrhosis and in some cases can even lead to hepatocellular cancer (HCC). ⁽³⁾ About 90% of people who consume more than 60 g/day of alcohol develop alcoholic fatty liver disease, but this condition can be totally reversed with abstinence. However, if they continue alcohol intake, 5 to 15% of them will develop alcoholic hepatitis. An estimate of up to 50% of these patients eventually progress to cirrhosis, a state of irreversible liver damage that can exacerbate into portal hypertension and cause upper gastrointestinal bleeding, ascites, splenomegaly and other

symptoms associated with chronic liver disease. The main contributor to liver cirrhosis in India is excessive alcohol use. ⁽⁴⁾ The significant inter-individual variation in the ALD phenotype is explained by genetic, epigenetic, and non-genetic factors. The liver has three mechanisms for breaking down alcohol and it is through alcohol dehydrogenase (ADH), cytochrome P-4502E1 (CYP2E1), and mitochondrial catalase. Alcohol-induced CYP2E1 occurs when alcohol intake is in excess, whereas ADH is used to break down small amounts of alcohol. ⁽⁵⁾ The diagnosis of ALD is substantiated by a thorough history, clinical, and lab results. However, imaging and liver biopsy results may be used to support it in ambiguous circumstances. According to the typical presence and distribution of hepatic steatosis, inflammation, and Mallory-Denk bodies, histological features of ALD can be determined. ⁽⁶⁾ Imaging techniques like ultrasonography, transient elastography, magnetic resonance imaging, the measurement of serum biomarkers and liver biopsy histology can all be used to assess the severity of Alcoholic fatty liver and liver fibrosis. The best treatment for all stages of ALD is alcohol abstinence achieved through psychosomatic intervention and appropriate medicinal intervention. In advanced cases of disease such as cirrhosis or hepatocellular cancer, liver transplantation is usually advised. ⁽³⁾

Nux Vomica

Nux vomica Strychnos Linn (Family: Loganiaceae), a medicinally significant plant also known as Nux vomica, or poison nut, has a wide range of therapeutic and clinical applications. Different parts of this plant, particularly the seeds and bark, have a wide range of therapeutic indications

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in traditional and folklore medicines from various countries. *Strychnos nux-vomica* Linn (Loganiaceae) is an evergreen tree native to Southeast Asia. Phytochemical studies on various parts revealed the presence of various constituents, primarily alkaloids, as well as flavonoids, iridoids, and phenolic glycosides. *Nux vomica* extracts and constituents have been shown to have hepatoprotective, antioxidant, antinociceptive, anti-allergic, anti-inflammatory, antimicrobial, anticancer, antipyretic, gastroprotective, antidiabetic, antialcoholic, anti-snake venom, and neuropharmacological properties. ⁽⁷⁾

- Kingdom: Plantae
- Division: Magnoliophyta
- Class: Magnoliopsida
- Order: Gentianales
- Family: Loganiaceae
- Genus: *Strychnos*
- Species: *Nux vomica* ⁽⁸⁾

Nux vomica is composed of various alkaloids like strychnine, brucine, igasuric acid, triterpene, carbohydrate, oils, phenol, fats, tannins, glucomennas, glycoside (loganin), steroids, iridoids, iridoid glycoside, flavonoids etc. Seed consist of the bulk of strychnine and brucine. ⁽⁹⁾ In Homoeopathy, the alcoholic tincture is prepared from the finely pulverized seed. The drug was introduced by Dr. Hahnemann in Homoeopathy and proved upon himself, his son Frederick, Stapf, Wahle and Flaeming. Later proving were done by Robinson, Berridge and Wilson, with high potencies. ⁽¹⁰⁾

Preparation: (a) Mother Tincture ϕ -Old method: Class IV (Tincture), Drug strength 1/10

(b) Potencies: 2x and higher with Dispensing Alcohol. ⁽¹¹⁾

Sphere of action

- Cerebro – Spinal Axis
- Nerves
- Digestive Organ – Stomach, Liver, Bowels.
- Respiratory Organs ⁽¹²⁾

Mechanism of action of physiological doses of strychnine

Strychnine, a major alkaloid of *Nux vomica*, is quickly absorbed from the digestive system after ingestion, concentrated in the liver, and is then detoxified oxidatively by cytochrome P450 enzymes. About 80 % of a dose of strychnine is oxidized in the liver to non-toxic metabolites and 20 % is excreted unchanged in urine and faeces. The half-time for the elimination of strychnine from the blood is 10 to 16 hours. ⁽¹³⁾

In poisoned persons the concentration of strychnine in the blood was mostly above 2 mg/l and in the liver above 4 mg/kg liver. After lethal intoxications of persons and dogs, the highest concentrations of strychnine were found in the blood, liver, bile and kidneys. Much lower levels were found in muscles, brain and even in the spinal cord, the main site of action of the substance. ⁽¹³⁾

Action of Nux Vomica in Alcoholic Liver Disease

Antioxidant

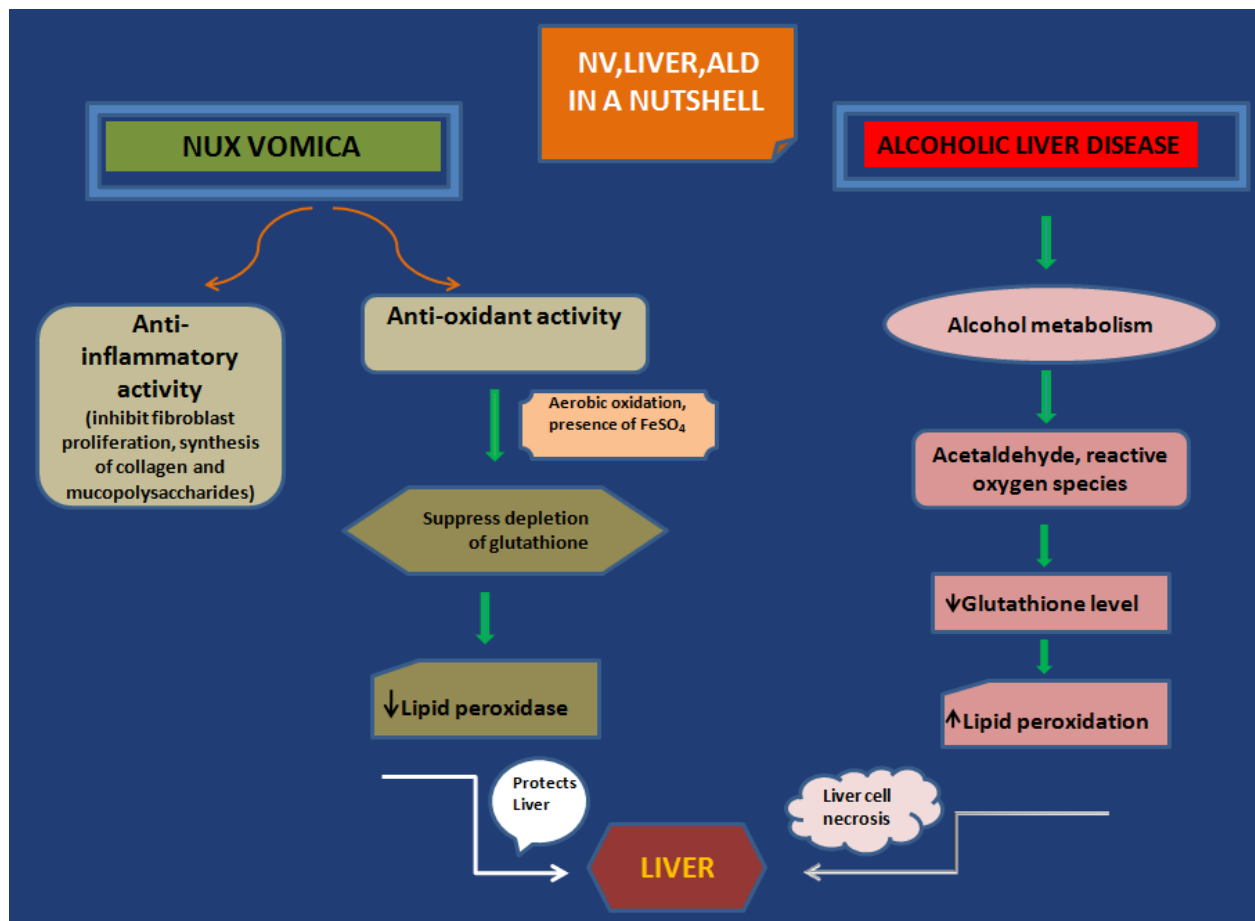
Tripathi et al, has shown in their article that strychnine in low and pharmacological doses, prevents the production of free radicals by reducing total iron from the body and by altering the mutual ratio of ferrous and ferric ions, which prevents the chain reaction of free radical production and lipid peroxidation. Here, the chelation of free iron from the system, which is the mechanism of action of *Nux-vomica* towards its antioxidant claim, is emphasized. ⁽¹⁴⁾ Alcohol-induced iron overload increases the synthesis of free radicals and inflammatory cytokines, which causes liver damage. ⁽¹⁵⁾ Hence *Nux vomica* can effectively be employed in the management of ALD.

Glutathione

Glutathione is an important endogenous antioxidant, which plays an important role in protecting cells against oxidative stress via glutathione redox system. The toxic effects of acetaldehyde, a by-product of ethanol metabolism, make mitochondria a target of ethanol intoxication. By metabolising oxygen free radicals generated in the respiratory chain, mitochondrial glutathione (GSH) plays an important role in the maintenance of cell functions and viability, as well as in mitochondrial physiology. GSH in mitochondria is derived from the cytosol via a transport system that transports GSH into the matrix. This transport system was impaired in chronic ethanol-fed rats, resulting in a selective and significant depletion of mitochondrial GSH content and an increased susceptibility to oxidant stress. The onset of alcoholic liver disease, mitochondrial lipid peroxidation, and the progression of liver damage are all preceded by this mitochondrial GSH depletion. ⁽¹⁶⁾ Tissue glutathione depletion is responsible for the stimulation of lipid peroxidation. ⁽¹⁷⁾

Nux vomica and Glutathione

Strychnos. nux vomica extract significantly suppresses the depletion of GSH by aerobic oxidation as well as in the presence FeSO_4 . *Strychnos. nux vomica* provides a type of non-enzymatic reducing agent in the system which spares the reduced glutathione from undergoing oxidation. ⁽¹⁸⁾



Articles supporting hepatoprotective action of Nux Vomica

- Visen et al. isolated loganin from the fruit of Nux vomica and demonstrated excellent anticholestatic activity and hepatoprotective potential in ex vivo and in vivo models of galactosamine-induced liver injury by its ability to alleviate the galactosamine-mediated reduction in hepatocyte viability and bile volume. ⁽¹⁹⁾
- Savita Chaurasia had shown the anti-inflammatory and antioxidant activities of the alcohol extract of the Strychnos nux vomica using carrageenan induced paw edema and the cotton pellet granuloma test albino rats. ⁽¹⁸⁾
- In vivo studies by Gopalkrishna et al. have shown that processed seed extract has hepatoprotective potential in Carbon tetrachloride (CCl₄) CCl-induced liver injury in rats. After 5 days of oral administration of varying doses of processed seed extract, serum levels of glutamate pyruvate transaminase (GPT), glutamate oxaloacetate transaminase (GOT), alkaline phosphatase (ALP), bilirubin, and cholesterol were reduced, along with glutathione (GSH) restoration and reduced lipid peroxidation in liver tissue. ⁽²⁰⁾
- Zhao et al. demonstrated the liver toxicity of Nux vomica in zebrafish and came to the results that the hepatotoxicity of Nux vomica resulted from metabolic pathway disturbances, including small molecules involved in energy, purine, lipids, and amino acid metabolism. ⁽²¹⁾
- YB, Tripathi and Chaurasia has shown the antioxidant properties of the purified Strychnos nux vomica seed

extract provides protection against non-enzymatic formation of lipid peroxides and on reduced glutathione (GSH) levels in rat liver homogenate, thus highlighting that *S. nux vomica* is a potent antioxidant and its mechanism of action was through the scavenging of free radicals. ⁽²²⁾

Stalwars view of action therapeutic action of Nux Vomica in liver diseases

- **N M CHOUDARY**
In his book, "A STUDY ON MATERIA MEDICA," the author says that, Nux vomica is our sheet anchor in induration and swelling of the liver caused by high living, debauchery and drunkenness. Region of the liver is sore, that they constantly loosen their clothes to relieve the oppression. ⁽²³⁾
- **RICHARD HUGHES**
His book, "THE PRINCIPLES & PRACTICE OF HOMEOPATHY, " mentions the craving for food with speedy satiety among the subjects of its influence and would include those who take alcohol in excess. In congestion of the liver caused by excess of stimulating food or alcohol, Nux vomica will be preferable. ⁽²⁴⁾
- **A. C COWPERTHWAIT**
In "A TEXTBOOK OF MATERIA MEDICA AND THERAPEUTICS, " he says that Nux vomica is indispensable in fatty liver, hypertrophy of the liver, cirrhosis of the liver, nutmeg liver and yellow atrophy of the liver. ⁽²⁵⁾

• **C. M. F. VON BONNINGHAUSEN**

In the book, "THE LESSER WRITING OF C. M. F. VON BONNINGHAUSEN," he says that Nux vomica is the quickest and surest relief from intoxication. When caused by beer, supposing this beer to have been pure and not adulterated and poisoned with medicinal substance; the abundant drinking of Chinese tea and afterwards according to indication, either Rhus or Nux, will be beneficial. ⁽²⁶⁾

• **E. A. FARRINGTON**

In his book, "LECTURES ON CLINICAL MATERIA MEDICA IN FAMILY ORDER," he says that Nux vomica has a marked action on the liver. It is particularly indicated in liver affections in those who have indulged to excess in alcoholic liquors and highly-seasoned food, or who have abused themselves with drastic purgatives. In the enlarged liver of drunkards. ⁽²⁶⁾

• **CONSTANTINE HERING**

In his book, "THE GUIDING SYMPTOMS OF OUR MATERIA MEDICA," he mentions indications of Nux vomica, as complaints arising from liver or gastric troubles, especially in drunkards. Liver swollen, indurated, sensitive, with pressure and stinging; cannot bear tight clothing; caused by high living, abdominal plethora, debauchery. Acute congestion of liver. Bilious attacks: loss of appetite, languor, pain in kidneys, backache, skin yellow, urine high colored. Enlarged liver of drunkards. ⁽²⁷⁾

• **ROBIN MURPHY**

In his book, "LOTUS MATERIA MEDICA," he mentions the following symptoms about Nux vomica-Liver region sore and enlarged sticking pain. Toxic liver from drug, chemical and alcohol. Liver weak from bad diet, meat, fats, spices, alcohol etc, (cirrhosis from alcohol poisoning). Alcoholic drinks aggravates. Indications of Nux vomica also includes hangover symptoms. ⁽²⁸⁾

• **SAMUEL LILIENTHAL**

In his book, "HOMEOPATHIC THERAPEUTICS," the author mentions about Nux vomica, its hepatic affections in good livers, in alcoholic excesses and after allopathic dosing. Liver swollen, hard and sensitive to pressure of clothing. ⁽²⁹⁾

• **REPERTORIAL APPROACH** ^{(30) (31)}

a) Synthesis Repertory

ABDOMEN-INFLAMMATION-Liver-alcohol; from

b) Murphy Repertory

- Constitutions-ALCOHOLIC, constitutions-liver, enlarged
- Liver-ATROPHY, of-nutmeg or alcoholic variety
- Liver-ENLARGED-alcoholics, in

Single remedy rubrics:

- Liver-IRRITABLE, Liver-alcohol after

- Liver-ENLARGED-pressure, with-and stinging, caused by high living, abdominal plethora, and debauchery
- Liver-MENTAL, symptoms, with liver disease-hypochondriasis, especially in alcoholics
- Constitutions-ALCOHOLIC, constitutions-hypochondriasis, from gastric or liver troubles

c) Boericke. O. Repertory

- ABDOMEN-Liver-Enlargement-in drunkards

d) Knerr Repertory

Single remedy rubrics

- Abdomen.-Liver-enlarged-- in drunkards
- Abdomen.-Liver-enlarged-- with pressure and stinging, caused by high living, abdominal plethora, and debauchery
- Abdomen.-Liver-mental, affection with, symptoms-hypochondriasis, especially in drunkards
- General.-Habit-drunkards-liver, enlarged

e) Complete Repertory

- ABDOMEN-CIRRHOSIS-liver-drunkards, in
- ABDOMEN-DROPSY-ascites-drunkards, in
- ABDOMEN-ENLARGED-liver-drunkards
- ABDOMEN-HARDNESS-liver region-drunkards, in
- ABDOMEN-INFLAMMATION-liver, hepatitis-drunkards, in

2. Conclusion

Alcoholic liver disease, the most rising issue in the face of the upcoming alcohol dependent societies, needs to be properly monitored and kept in check. Homeopathy one of the most popular holistic systems of medicine is gaining its fame in the management of Alcoholic liver disease. Nux vomica, a Homeopathic drug of plant origin, known to counteract alcohol effect, proves to be effective against ethanol induced liver injury by inhibiting destruction of cell membrane through oxidative stress, restoring the antioxidant defense mechanism and prevention of lipid peroxidation. Hence it proves to be a valuable medicine in the management of Alcoholic liver disease.

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