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Review article

Alcoholic neuropathy and remedies

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Abstract

Neuropathy is caused by a wide variety of factors, however majority of them are under reported till date. Medicinal plants have been used in research long before the centuries to extract out the therapeutic effect in order to relieve the morbidities. The administration of alcohol for long time causes the advent of alcoholic neuropathic like state. Herbal drugs offer a novel approach in the treatment of the disorder. Thus, further exploration is needed in order to explore the further mechanism that will provide substantial support for claiming the therapeutic effect.

Key words: neuropathy; chronic; alcoholism; remedies; immunity

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1. Introduction

Neuropathy is caused by a number of factors including heredity causes, induction of diabetes like morbidity, advent of arthritis problem, HIV and cancer disorders and induction of heavy metals like arsenic, lead and mercury. The ingestion of alcohol causes the problem of neuropathy to a wider extent, which cannot be ignored. The role of nutritional deficiencies is also playing a mandate role in the progression of neuropathic like state, indeed worsens the disorder and may lead to mortality issues also. The administration of medications like ddl and d4T also causes the progression of the disease. Apart these causative factors, the condition of the neuropathy worsens to the utmost level when a person is suffering from fever or any other disorder that leads to loss of immunity occurs because that condition destroys the myelin sheath that provides protective covering of the nerves and neurons. In certain cases, the capacity of regeneration occurs that leads to the origination of new cells that improvise the conditions. However, the regeneration capacity is further limited by many other factors including the morbidity and mortality issues. Herbal supplements alleviate and attenuate the issue of

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neuropathy pain to a major extent and has provided a therapeutic effect for the same.
Emergence of vitamin D as a regulator of the immune system and to prevent the destruction of myelin sheath cannot be ignored. This has become possible due to the antioxidant capacity of vitamin D. The supplementation of brain by vitamin D is mandate for the smooth functioning of the brain and to maintain the normal metabolic activities. Studies form literature reveals that vitamin B 12 is essential for maintaining and repairing the destroyed myelin sheath and thus helps in maintaining the nervous system healthy. Vitamin C complex is also good supplement regimen since it is water soluble, and therefore is being stored as a reserve in the body.

2. Alcoholic Neuropathy

The consumption of alcohol for a long period produces a complex cascade of disorders that attributes to complications which disrupts the homeostatic mechanisms occurring in the human body [1]. These changes cause the various alterations affecting the life quality of the person to a great extent. The numerous complications arise because of the poor understanding of the mechanisms that contribute widely to these disorders [2-3].
Chronic consumption of alcohol leads to advent of peripheral neuropathy. This leads to low threshold of pain that contributes to lower deformities. Axonal degeneration is also quite common with the consumption of alcohol for longer periods [4-6]. This leads also to degeneration of myelinated and unmyelinated fibres.
The alcoholic neuropathy has caused significant alterations in the neuronal and axonal level. Thus, the homeostatic mechanisms get disturbed by the causation of various complications that leads to the progression of neuropathy [7].

3. Pathogenesis

The underlying mechanism beneath this concept is also not well understood. The effect of chronic alcohol consumption on nervous system cannot be ignored as parasympathetic system is also halted to a large extent.
Large debate occurs on understanding the pathophysiology of alcoholic neuropathy. The quantity of the alcohol that leads to the symptoms of alcoholic neuropathy is also not well-established [8-11]. The most studies done in the past have revealed association of the chronic alcohol consumption with the effect on the nervous system.
The reports from the previous studies associate largely thiamine deficiency responsible for the precipitation of many symptoms that are well seen in the alcoholic neuropathy. The alcoholic neuropathy symptoms are a result of the consumption of ethanol and its metabolites as well the deficiencies that also go hand in hand with the disorder.
The deficiency of vitamins leads to the onset of various severe symptoms that contribute largely to the affect the increased level of glucose and impaired utilization of B12 also occurs with the symptoms of alcoholic neuropathy.This phenomenon may be resp onsible for the induction of the neuropathic pain like behaviour following chronic ethanol consumption.

4. Symptoms

Alcoholic polyneuropathy has similar symptoms as that of other kinds of neuropathies, e.g., tingling and numbness in the extremities, loss of heat

and cold sensation, loss of fine motor control etc [12-14]. Symptoms usually develop slowly and worsen with time

- Numbness in the arms and legs
- Abnormal painful sensations in limbs
- Muscle weakness,
- Cramps
- Heat intolerance.
- Impotency in men
- Urinating problems including: Incontinence (leaking urine), Feeling of incomplete bladder emptying, Difficulty beginning to urinate
- Sub-perineurialedema
- Other symptoms
  Weight loss (occurring mostly due to nutritional deficiency), Constipation, Diarrhoea, Nausea/vomiting [15], Swallowing difficulty, Movement disorders.

In severe cases, both upper and lower limbs are affected which may entirely be absent in the extremities [16,17]. In such cases, the skin becomes dehydrated, rough and atrophic.

5. Treatments

1. Benfotiamine

Benfotiamine (S-benzoylthiamine O-mono phoshate) is a synthetic S-acyl derivative of thiamine (vitamin B1). A deficiency of vitamin B1 is attributed due to inadequate intake of dietary supplements, reduced hepatic storage and various other factors like reduced transportation and absorption [18-21]. Benfotiamine has caused significant improvement in patients suffering from alcoholic polyneuropathy.

The administration of alcohol for a long period causes the significant destruction of the thiamine due to inhibition of the enzyme thiamine diphosphate. The studies from the literature revealed that benfotiamine has significant improvement on paralysis and motor coordination parameters: however the reason for the same is not well understood. However further studies are needed to explore the hidden mechanisms.

2. Alpha lipoic acid

Alpha lipoic acid till date is the most well explored nutrient used in the treatment of not only neuropathy and associated complications. The same has been used in western countries from long decades. The administration of streptozotocin in rats caused the problem of neuropathy and alpha lipoic has proven out to be beneficial in this condition. It cause the significant increase in the levels of glucose, glutathione and also normalises NAD:NADH ratio. Thus it has also a good therapeutic effect in the treatment of neuropathic pain.

3. Acetyl-L-carnitine

Acetyl-L-carnitine is used in the treatment of peripheral neuropathy and has been used widely in large number of clinical and animal studies. Attenuation in the levels of nerve conduction velocity was reduced to a great extent in the animals supplanted with Acetyl- L-carnitine. However much research need to be done in this domain in order to rule out the exact mechanism for the treatment of disorders.

4. Vitamin E

One of the most important fat soluble compounds include vitamin E that has been widely used in the treatment of many neuropathic complications including alcohol induced neuropathic pain, streptozotocin induced neuropathic pain and other peripheral

neuropathies. Data elucidated from the previous studies indicates the significant improvement in rats fed with vitamin E as evidence by absence of hyperalgesia and allodynia in the rats [22]. The hyperalgesia and allodynia are well known markers for the neuropathic pain. However vital screening of the components is necessary in order to ensure the therapeutic effect.

5. Myo-inositol

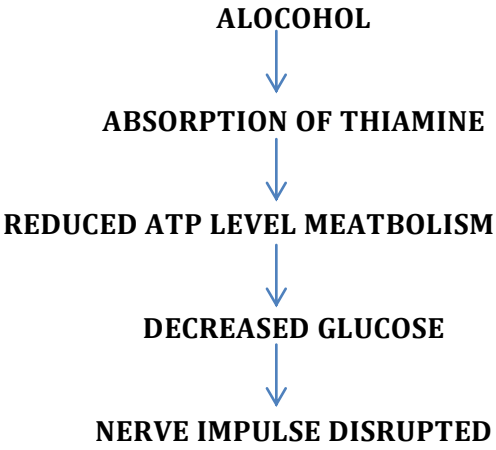
The cell membranes are made up of phospholipids of which myo-inositol is an important constituent. The patients suffering from one or other form of neuropathic complications have low levels of myo-inositol content [23]. Thus, the administration has proved to cause a significant effect. The reduction in the nerve conduction velocity occurs to be a major mechanism that contributes to relief in the neuropathic complications. The neuronal degeneration and loss of myelin sheaths are characteristics features that are associated with the pathogenesis of neuronal complications and further studies are warranted in the conformation of the effect of the therapeutic effect of myo-inositol.

6. Anticonvulsants

Gama amino butyric acid (GABA) has analogue gabapentin, which has emerged as a drug of prime importance in the treatment of neuropathic complications. The activity is attributed due to anticholinergic and sedative effects. And also relieves post stroke pain. Another drug Lacosamide, which has emerged as a new anticonvulsant drug has also shown some beneficial effects in the treatment of neuropathy associated complications.

7. Capsaicin Cream

Capsaicin is an important constituent of *Capsicum officinalis* and has been used in the treatment of neuropathic complications [24]. The parameters like motor in coordination and paralysis has attracted the attention of various researchers to investigate the therapeutic effect in alleviation of many symptoms of neuropathic pain.



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