Original Research Article

A Tertiary Care Hospital Based Prospective Study for Evaluation of Peripheral Nerve Conduction and Superoxide Dismutase Levels in Alcoholic Dependence Syndrome

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Abstract

Background: The development of alcohol dependence is a complex and dynamic process. When some persons with alcohol dependence reduce or stop taking alcohol, they develop a set of symptoms and signs called as alcohol withdrawal syndrome. Hence; the present study was conducted in the department of human anatomy, physiology and general surgery with the aim of assessing Peripheral Nerve Conduction and Superoxide Dismutase (SOD) Levels in Alcoholic Dependence Syndrome.**Materials & Methods:** A total of 50 patients with presence of alcoholic dependence syndrome were enrolled. Complete demographic and clinical details of all the subjects were obtained. Another set of age matched 50 healthy subjects were enrolled as control group. For the determination of SOD activity, sandwich enzyme-linked immunosorbent assay (ELISA) was used. SOD expressed in U/ml. Peripheral nerve conduction was evaluated. All the results were recorded and analyzed by SPSS software. Pearson's correlation was used for evaluation of level of significance. **Results:** Mean SOD levels among alcoholic syndromic group and control group was 41.8 U/ml and 26.2 U/ml respectively. Significant results were obtained while comparing the mean SOD levels among the two study groups. Peripheral neuropathy was seen in 24 percent of the patients of the study group.**Conclusion:** There is significant alteration in the Peripheral Nerve Conduction and Superoxide Dismutase Levels in Alcoholic Dependence Syndrome patients.

Keywords: Superoxide Dismutase, Alcoholic Dependence Syndrome

Introduction

The development of alcohol dependence is a complex and dynamic process. Many neurobiological and environmental factors influence motivation to drink. At any given time, an individual's propensity to imbibe is thought to reflect a balance between alcohol's positive reinforcing (i.e., rewarding) effects, such as euphoria and reduction of anxiety (i.e., anxiolysis), and the drug's aversive effects, which typically are associated with negative consequences of alcohol consumption (e.g., hangover or withdrawal symptoms). Memories associated with these rewarding and aversive qualities of alcohol, as well as learned associations between these internal states and related environmental stimuli or contexts, influence both the initiation and regulation of intake. These experiential factors, together with biological and environmental influences and social forces, are central to the formation of expectations about the consequences of alcohol use. These expectations, in turn, shape an individual's decision about engaging in drinking behavior[1-3]. Alcohol dependence affects the individual as well as those around them in terms of occupational and social dysfunction, physical and emotional distress, and financial burden which has a serious impact on the lives of the significant others[4].

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When some persons with alcohol dependence reduce or stop taking alcohol, they develop a set of symptoms and signs called as alcohol withdrawal syndrome. Various mechanisms have been put forward to explain the development of withdrawal symptoms. The most accepted explanation for the withdrawal phase is increased excitatory glutamatergic and reduced inhibitory GABAergic neurotransmission in the central nervous system (CNS). Oxidative stress is hypothesized to be one mechanism mediating these withdrawal symptoms[5-7]. Hence; the present study was conducted in the department of human anatomy, physiology and general surgery with the aim of assessing Peripheral Nerve Conduction and Superoxide Dismutase (SOD) Levels in Alcoholic Dependence Syndrome.

Materials & Methods

The present study was conducted in the department of human anatomy, physiology and general surgery with the aim of assessing Peripheral Nerve Conduction and Superoxide Dismutase Levels in Alcoholic Dependence Syndrome. A total of 50 patients with presence of alcoholic dependence syndrome were enrolled. Complete demographic and clinical details of all the subjects were obtained. Inclusion criteria for present study included:

- Presence of Alcohol dependence syndrome as per International Classification of Disease, 10th revision, Diagnostic Criteria for Research criteria,
- Age range between 18-60 years of age,
- Male gender
- Patients who gave informed consent

Another set of age matched 50 healthy subjects were enrolled as control group. Those with pre-existing unstable medical conditions including hepatic encephalopathy, pre-existing comorbid psychiatric illnesses and pre-existing diagnosed medical conditions that could

affect oxidative stress, autoimmune diseases, malignancy, diabetes mellitus and hypertension excluded from both the groups. Five milliliter of venous blood collected from each subject of both the groups. For the determination of SOD activity, sandwich enzyme-linked immunosorbent assay (ELISA) was used. SOD expressed in U/ml. Peripheral nerve conduction was evaluated with clinical examination and history and/or electrophysiology. All the results were recorded and analyzed by SPSS software. Pearson's correlation was used for evaluation of level of significance.

Results

The mean age of study group was 43.3 years and the mean age of controls was 41.8 years. The average duration of alcohol dependence was 12.3 years. 58 percent of the subjects of the study group and 62 percent of the subjects of the control group were of rural residence. Mean SOD levels among alcoholic syndromic group and control group was 41.8 U/ml and 26.2 U/ml respectively. Significant results were obtained while comparing the mean SOD levels among the two study groups. Peripheral neuropathy was seen in 24 percent of the patients of the study group.

Table 1: Demographic data

Variable	Alcoholic syndrome group	Control group
Mean age (years)	43.3	41.8
Rural residence (%)	58	62
Urban residence (%)	42	38
Average duration of alcohol dependence (years)	12.3	-

Table 2: Comparison of SOD levels

SOD levels (U/ml)	Alcoholic syndrome group	Control group
Mean	41.8	26.2
SD	6.7	4.9
p- value	0.000 (Significant)	

Table 3: Prevalence of peripheral neuropathy

SOD levels (U/ml)	Alcoholic syndrome group	Control group
Number of patients	12	0
Percentage	24	0
p- value	0.000 (Significant)	

Discussion

Alcohol dependence is a complex behavior with far-reaching harmful effects on the family, work, society, as well as on the physical and mental health of the individual. Epidemiological studies conducted in India showed that 20-30% of our population is using alcohol at a harmful level. An alcohol-dependent person seeks professional help mostly persuaded by his wife, family members, neighbors, co-workers, employer, etc. Need for immediate care may be due to a threat of divorce, dismissal from job, serious injury due to fall, aborted marriage proposal to his ward, health hazards, etc. Many studies conducted in the field of alcoholism have concluded that better outcome is possible when alcohol-dependent persons receive nonpharmacological therapy along with pharmacological treatment. However, most of these studies were confined to selective psychotherapy techniques, leaving the comprehensive psychosocial treatment to be an unexplored area[7-9].Hence; the present study was conducted in the department of human anatomy, physiology and general surgery with the aim of assessing Peripheral Nerve Conduction and Superoxide Dismutase Levels in Alcoholic Dependence Syndrome.In the present study, the mean age of study group was 43.3 years and the mean age of controls was 41.8 years. The average duration of alcohol dependence was 12.3 years. 58 percent of the subjects of the study group and 62 percent of the subjects of the control group were of rural residence. Mean SOD levels among alcoholic syndromic group and control group was 41.8 U/ml and 26.2 U/ml respectively. Significant results were obtained while comparing the mean SOD levels among the two study groups. Our results were in concordance with the results obtained by Thome J et al who also reported similar findings. In their study, authors determined oxidative stress-associated parameters [concentrations of lactofenin, Cu,Zn-superoxide dismutase (SOD) and Mn-SOD] in sera of 20 patients suffering from alcohol dependence immediately after detoxification and in IS non-dependent healthy subjects as controls. In the patient group, the mean Mn-SOD concentration reached almost double the values of those from the control group (142.9 vs 76.0 ng/ral, $P < 0.01$). The other parameters tended to be increased in patients but did not differ significantly between index and control groups. The findings were consistent with increased oxidative stress due to chronic alcohol intake, which might be responsible for secondary diseases such as brain atrophy, peripheral polyneuropathy and liver fibrinogenesis[10]In the present study, peripheral neuropathy was seen in 24 percent of the patients of the study group. As per data provided be previous studies, the prevalence of peripheral neuropathy diagnosed using history and examination, gave a pooled prevalence of 44.2% (Pessione F et al, Hilz MJ et al, Monforte Roser)[11-13]. In another study conducted by Julian T et al, authors established the prevalence, character, and risk factors of peripheral neuropathy amongst chronic alcohol abusers and to identify the most appropriate management strategies. A systematic, computer-based search was conducted using the PubMed database. Data regarding the above parameters were extracted. 87 articles were included in their review, 29 case–control studies, 52 prospective/retrospective cohort studies and 2 randomized control trials, 1 cross sectional study, and 3 population-based studies. The prevalence of peripheral neuropathy amongst chronic alcohol abusers is 46.3% when confirmed via nerve conduction studies. Alcohol-related peripheral neuropathy generally presents as a progressive, predominantly sensory axonal length-dependent neuropathy. The most important risk factor for alcohol-related peripheral neuropathy is the total lifetime dose of ethanol, although other risk factors have been identified including genetic, male gender, and type of alcohol consumed[14].

Conclusion

From the above results, the authors conclude that there is significant alteration in the Peripheral Nerve Conduction and Superoxide Dismutase Levels in Alcoholic Dependence Syndrome patients.

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