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Original article

Distribution of neuropathies and autonomic function disorders in chronic alcoholics at tertiary care hospital: Observational study

[1]Dr. Jagannath S Dhadwad*, [2]Dr. Namrata Chawre

[1]Professor, Medicine Department, Pad. Dr. D. Y Patil Medical College ,Pimpri , Pune
[2]Resident, Medicine Department, Pad. Dr. D. Y Patil Medical College ,Pimpri , Pune
Corresponding author*

Abstract:

Introduction: Symptoms of alcoholic peripheral neuropathy include impairments in sensory, motor, autonomic, and gait functioning that develop over a period of months. The primary and most common sign of alcoholic neuropathy is pain, either searing or dull.

Materials and methods: The present study was conducted in the Department of Medicine, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pune, Maharashtra, from August 2019 to September 2021. Total 100 chronic alcoholic heavy drinkers were chosen after a detailed history and clinical examination.The study protocol was reviewed by the concerned Ethical Committee and was granted ethical clearance. After explaining the purpose and details of the study, a written informed consent was obtained from the patients.

Results : In our study the major autonomic symptoms reported by the patients were erectile dysfunction (27%), sweating disturbances (17%), postural giddiness (9%) and bladder disturbances (3%).In the autonomic function tests, H reflex was observed in 43%, Heart Rate Variability in 30% and Sympathetic Skin response in 27%.There was no association between the severity of alcoholic somatic neuropathy and the presence of autonomic neuropathy

Conclusion: The present study concluded that a longer duration of alcohol use as well as increased age were shown to be related with a more severe type of peripheral neuropathy. Autonomic characteristics were seen in one-fourth of individuals with alcoholic neuropathic disease. In patients with alcoholic neuropathy, erectile dysfunction was the most prevalent autonomic symptom. In the case of alcoholic neuropathy, there was no evidence of a simultaneous involvement of somatic and autonomic fibres.

Keywords: Autonomic function tests, Peripheral neuropathy, chronic alcoholics, H – reflex

Introduction:

Symptoms of alcoholic peripheral neuropathy include impairments in sensory, motor, autonomic, and gait functioning that develop over a period of months. The primary and most common sign of alcoholic neuropathy is pain, either searing or dull.[1,2] Occasionally, these sensations might be so excruciating and debilitating that they need medical attention. In the latter stages, distal regions of the limbs begin to weaken. As the sensory and motor symptoms and indications progress, they may affect the arms and legs, and eventually, the gait. Symptoms often worsen over months or years, with no sudden spikes in severity.[3,4]

Axonal neuropathy with decreased densities of nerve fibres is the most likely diagnosis based on electrophysiological and pathological data. However, in individuals with a lengthy history of neuropathic complaints and substantial axonal sprouting, tiny and unmyelinated fibre densities were more severely diminished than big and myelinated fibre densities.[5] Subperineurial oedema is more common in thiamine deficiency neuropathy, while segmental de/remyelination resulting from enlargement of successive nodes of Ranvier is more common in alcoholic neuropathy.[6]

Materials and methods:

The present study was conducted in the Department of Medicine, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pune, Maharashtra, from August 2019 to September 2021. Total 100 chronic alcoholic heavy drinkers were chosen after a detailed history and clinical examination.The study protocol was reviewed by the concerned Ethical Committee and was granted ethical clearance. After explaining the purpose and details

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of the study, a written informed consent was obtained from the patients.

Inclusion criteria

- Male subjects consuming 60 gm/day or more of ethanol for 5 years or more/ Male subjects consuming 15 drinks or more /week.
- Female subjects consuming 20-40gm/day or more for 5 years or more/ female subjects consuming 8 drinks or more/week

Exclusion criteria

- Patients with known case of diabetes .
- Patients with chronic renal failure.
- Patients with Liver disease/LFT abnormalities other low albumin.
- Patients with malignancy.
- Patients on drugs known to cause peripheral neuropathy.
- Patients with a family h/o inherited neuropathies.
- Patients with h/o exposure to heavy metals and toxins.
- Patients with h/o lumbar or cervical radiculopathy.
- Patients with nutritional deficiencies.
- Patients with collagen vascular diseases.
- Patients with hypothyrodism, dysproteinemias, amyloidosis and AIDS.

Results:

The overall mean age of the study population was 39.91 years. Majority of them belongs the age group of 41-45 years (33%) followed by 46-50 years (22%), 31-35 years and 36-40 years (18% each) and 25-30 years (9%)

Table 1: Distribution of type of Neuropathy in the study population

Neuropathy	Frequency	Percent
Sensory Neuropathy	54	54.0
Sensory + Autonomic Neuropathy	21	21.0
Sensorimotor Neuropathy	19	19.0
Sensorimotor + Autonomic Neuropathy	6	6.0
Total	100	100.0

Major type of neuropathy observed was Sensory Neuropathy (54%) followed by Sensory + Autonomic Neuropathy (21%), Sensorimotor Neuropathy (19%) and Sensorimotor + Autonomic Neuropathy (6%).

Table 2: Association between age and UENS score in the study population

Age (In Years)	N	UENS Score		p-value
		Mean	Std. Deviation	
25-30	9	21.4444	4.55826	0.001 (Sig.)
31-35	18	26.5556	3.74515	
36-40	18	27.1111	4.50997	
41-45	33	32.6667	4.17333	
46-50	22	33.1818	3.63366	
Total	100	29.6700	5.55424	

Test applied: One-way ANOVA

The highest Mean UNES score of (33.1818) was observed in the age group 46-50 years followed by (32.6667) in 41-45 years, (27.1111) in 36-40 years, (26.5556) in 31-35 years and (21.4444) in 25-30 years of age group. On One-way analysis of variance statistically significant association was observed between age and UENS score (p=0.001).

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Table 3: Association between duration of alcohol consumption and UENS score in the study population

Duration of alcohol consumption	N	UNES Score		p-value
		Mean	Std. Deviation	
<5	14	21.7857	3.37818	0.001 (Sig.)
5-15	42	28.0952	3.69449	
>15	44	33.6818	3.92827	
Total	100	29.6700	5.55424	

Test applied: One-way ANOVA

Out of 100 patients 44 patients with duration of exposure to alcohol was >15 years had highest UNES score of 33.6818 followed by 5-15 years of exposure had UNES score 28.0952 and those with <5 years of exposure had mean UNES score of 21.7857. On One-way analysis of variance statistically significant association was observed between duration of alcohol consumption and UENS score (p=0.001).

Table 4: Distribution of abnormal CMAP and SNAP in both upper and lower limb

Variables	Frequency	Percent
Upper Limb Compound Muscle Action Potential	8	8.0
Lower Limb Compound Muscle Action Potential	29	29.0
Upper Limb Sensory Nerve Action Potential	16	16.0
Lower Limb Sensory Nerve Action Potential	73	73.0
Total	100	100.0

Abnormal upper and lower limb compound muscle action potential was observed in 8% and 29% of the patients. Abnormal upper and lower limb sensory nerve action potential was seen in 16% and 73% of the study population.

Table 5: Distribution of abnormal H reflex, Heart Rate Variability and Sympathetic Skin Response in the study population

Variables	Frequency	Percent
H reflex	43	43.0
Heart Rate Variability	30	30.0
Sympathetic Skin Response	27	27.0

Out of total 100 patients in the study abnormal H reflexwas observed in 43%, Heart Rate Variability in 30% and Sympathetic Skin response in 27%.

Discussion:

In our study, it was found that among 100 patients with alcoholic neuropathy, overall mean age of the study population was 39.91 years. Majority of them belongs the age group of 41-45 years (33%) followed by 46-50 years (22%), 31-35 years and 36-40 years (18% each) and 25-30 years (9%). A strong association was found between age and the occurrence of alcoholic neuropathy. Subjective symptoms and signs rose dramatically with age, as shown by Vittadini Get al.[7] in their clinical and epidemiological series. After 40 years of alcohol exposure, researchers studied 48 alcoholic neuropathic patients and found that polyneuropathy incidence skyrockets. Both Behese and Buchtal and Wetterling found that the length of alcohol usage was most essential in the development of polyneuropathy, as well.[8]

In our study the major autonomic symptoms reported by the patients were erectile dysfunction (27%), sweating disturbances (17%), postural giddiness (9%) and bladder disturbances (3%).In

the autonomic function tests, H reflex was observed in 43%, Heart Rate Variability in 30% and Sympathetic Skin response in 27%. During our investigation, we found that two individuals showed objective autonomic indications prior to the onset of subjective symptoms. Only one-fourth of the alcoholic neuropathy patients in our study reported autonomic symptoms, indicating that there is no simultaneous involvement of somatic and autonomic fibres in this disease. Patients with alcoholic neuropathy should be examined for subclinical autonomic neuropathy, even in the absence of subjective indications of autonomic dysfunction. Screening bedside autonomic function testing should be done in all patients with alcoholic neuropathy because autonomic impairment starts before symptoms and indications of peripheral neuropathy.

There was no association between the severity of alcoholic somatic neuropathy and the presence of autonomic neuropathy, as reported by Nicolosi C et al. in their investigation.[9] M.W. Agelinka et colleagues found that 40% of alcoholic neuropathy patients displayed aberrant HRV to deep inspiration and prolonged hand grip in the form of autonomic neuropathy. [10]

In our study motor weakness of great toe in the study population was observed in the 25% of the patients. Sensory Neuropathy (54 percent) was the most common kind of neuropathy identified in our research, followed by Sensory + Autonomic Neuropathy (21 percent), Sensorimotor Neuropathy (19 percent), and Sensorimotor + Autonomic Neuropathy (19 percent), all of which were observed in our study (6 percent).

Utah Early Neuropathy Scale Score is used to assess small fiberpredominant neuropathies. The highest Mean UNES score of (33.1818) was observed in the age group 46-50 years followed by (32.6667) in 41-45 years, (27.1111) in 36-40 years, (26.5556) in 31-35 years and (21.4444) in 25-30 years of age group. As age increases, On One-way analysis of variance statistically significant association was observed between age and UENS score (p=0.001). Out of 100 patients 44 patients with duration of exposure to alcohol was >15 years had highest UNES score of 33.6818 followed by 5-15 years of exposure had UNES score 28.0952 and those with <5 years of exposure had mean UNES score of 21.7857. On as duration of alcohol abuse increases, Utah Early Neuropathy Scale (UENS) Score increases. One-way analysis of variance statistically significant association was observed between duration of alcohol consumption and UENS score (p=0.001).

Conclusion:

The present study concluded that a longer duration of alcohol use as well as increased age were shown to be related with a more severe type of peripheral neuropathy. Autonomic characteristics were seen in one-fourth of individuals with alcoholic neuropathic disease. In patients with alcoholic neuropathy, erectile dysfunction was the most prevalent autonomic symptom. In the case of alcoholic neuropathy, there was no evidence of a simultaneous involvement of somatic and autonomic fibres.

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