

Brief Review on Alcohol Related Dementia; Scope of Occupational Therapy

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ABSTRACT

This article is an effort to review course and impact of Alcohol related dementia following chronic alcoholism. It is well established that excessive and prolonged alcohol use can lead to permanent damage to the structure and function of the brain. There is not much literature on the characteristics of a dementia syndrome related to sustained alcohol abuse. Alcoholism causes a multitude of social and health problems with negative impact on quality of life and secondary costs to society. Cognitive impairments observed in alcohol-dependent patients not presenting any other neurological complications are increasingly becoming the focus of attention amongst medical fraternity. Alcohol Related Dementia has little recognition as a discrete clinical entity and this is due to lack of a distinct pathophysiological profile. However, autopsy evaluations suggest that up to 78% of individuals with diagnosed alcoholism demonstrate some degree of brain pathology leading to minimal cognitive impairment. Assessment tool like Montreal Cognitive Assessment (MoCA) Test appears to be the most appropriate screening test for detection of cognitive impairments in these patients. It is mostly irreversible condition but a period of several months of abstinence allows some improvement of cognitive functions with targeted Occupational Therapy intervention. This results in improving Quality of life of patients with diagnosis of Alcohol dependence.

Key words: Alcohol related dementia, Minimal cognitive impairment, Montreal Cognitive Assessment, Occupational Therapy, Cognitive rehabilitation.

INTRODUCTION

Alcohol dependence or alcohol addiction, is a destructive pattern of alcohol use that includes tolerance to or withdrawal from the substance, using more alcohol or using it for longer than planned, and trouble reducing its use. It is well established that excessive and prolonged alcohol use can lead to permanent damage to the structure and function of the brain. [1] There is not much literature on the characteristics of a dementia syndrome related to sustained alcohol abuse. Alcoholism causes a multitude of social and health problems with

negative impact on quality of life and secondary costs to society. [2-4]

From a neurobiological perspective, alcohol-dependence is a chronic disorder, which implies the dopaminergic system. As seen in other drugs abuses, alcohol consumption acutely stimulates dopamine (DA) release from the major terminal area of the mesolimbic DA system, nucleus accumbens (NAC). Enhanced DA transmission in the NAC plays a critical role in the positive rewarding aspects of drugs abuses and the initiation of addictive process. Chronic administration is

associated with functional alterations of this important part of the brain reward system. Globally, dysregulation of the dopaminergic system caused by chronic alcohol consumption produces drug dependence reinforcement and is most likely involved in the development of drug addiction. [5-7]

The harmful effects of chronic alcohol consumption on the brain and cognitive functioning have been well described in the literature over recent decades. [8] Cognitive impairments observed in alcohol-dependent patients not presenting any other neurological complications are increasingly becoming the focus of attention amongst medical fraternity. However, detailed neuropsychological assessment or screening of these cognitive impairments appears to be fundamental to optimally adapt patient management strategies.

The relative paucity of research into the epidemiology of alcohol-related dementia could be partly due to problems in nosology and recognition, variable ascertainment of drinking patterns and difficulty in establishing exposure using case-control methods. Various studies have suggested the prevalence of alcohol-related dementia to be about 10% of all cases of dementia. 'Heavy alcohol use' was seen as possible contributing factor in 21–24% cases of dementia in a review of epidemiological, neurological, cognitive and imaging data.

What is Alcohol related Dementia...?

Present diagnostic criteria for alcohol-associated cognitive disorders focus on two main syndromes of impairment: Wernickes Korsakoff Syndrome and Alcohol Related Dementia. (ARD)

Alcohol Related Dementia has little recognition as a discrete clinical entity and this is due to lack of a distinct pathophysiological profile. [9,10]

Much of the debate surrounding ARD encompasses whether it is possible to have a dementia that is the direct result of ethanol neurotoxicity – a primary alcoholic dementia –or whether the clinical

presentation of dementia represents another underlying pathology (that is, thiamine deficiency) or multiple factors (for example, neurotoxicity in combination with nutritional deficiencies). In some countries, terms such as 'alcohol related brain damage' or 'alcohol-related brain injury' are preferred over ARD to reflect the heterogeneity of alcohol-related cognitive disorders in both aetiology and clinical presentation. [11]

The pathophysiology of Alcohol-related dementia

Autopsy evaluations suggest that up to 78% of individuals with diagnosed alcoholism demonstrate some degree of brain pathology. [12]

Neuroimaging and neuropathological evidence show prominent white matter loss (most notable in the prefrontal cortex, corpus callosum, and cerebellum) and neuronal loss in the superior frontal association cortex, hypothalamus, and cerebellum. [13]

The frontal lobes of individuals with diagnosed alcoholism appear particularly susceptible to damage, with evidence of markedly decreased neuron density, volume shrinkage, and altered glucose metabolism and perfusion. [14]

Partial recovery of white matter disturbances can occur with abstinence, and magnetic resonance imaging studies indicate early reversibility of white matter shrinkage that is accompanied by clinical improvement in cognitive and motor abilities. [15,16]

The mechanism behind recovery from white matter damage is thought to involve the restoration of myelination and axonal integrity, but is vulnerable to repeated disruption if drinking is resumed. One of the studies concludes that the brain pathology of abusers of alcohol likely has two components: one of permanent change, the other transient.

Cognitive impairments associated with excessive Alcohol use. [29]

Assessment of cognitive deficit

The detection of cognitive impairments in alcohol- dependent patients is therefore essential and should be systematic. The Montreal Cognitive Assessment (MoCA) Test appears to be the most appropriate screening test for detection of cognitive impairments in these patients. [24] This tool is more sensitive than the Mini Mental State Examination (MMSE) for mild-to-moderate cognitive impairments. [25] In the alcohol-dependent population, the most susceptible executive processes to be evaluated are working memory, mental flexibility, inhibition, processing speed, concept formation, planning, and problem-solving capacities. Evaluation of verbal and visual memory must focus on encoding, recall, storage, learning, and recognition capacities, while assessment of visuo-spatial functions must focus on visuo-spatial organization and visuo-construction capacities. Occupational therapists conduct holistic assessment of people with Alcohol use disorder using various models like Occupational Therapy performance measure (OTPF), Model of Human Occupation (MOHO). [30] This includes assessment of various performance components such as Physical (Sensory, Motor coordination & balance, Cognitive), Social, Cultural, Environmental, assessment of various Performance areas like Activities of Daily Living (ADL), Work & Leisure. Occupational Therapy focuses on Quality of life of patient as well as caregiver using various models of assessment and intervention. [27]

Prognosis: Is it reversible?

The study of alcohol- dependent patients also constitutes model of brain plasticity, as an increase of brain volume characterized by increased white matter and grey matter volumes and a reduction of the size of sulci and ventricles is observed right from the first months of abstinence. The cognitive effects of this recovery consist of

improvement of executive functions and verbal episodic memory.

In parallel, it has been shown that new brain regions can be recruited by recently weaned alcohol-dependent patients to compensate for alcohol- related brain damage. Neuro adaptation mechanisms there for enable patients to maintain a similar level of performance on cognitive tasks to that of control subjects. For example, alcohol-dependent patients recruit neuronal networks parallel to the fronto-cerebellar circuit normally used by control subjects to perform executive tasks.

However, although abstinence allows an improvement of cognitive functions, this is only achieved after a period of several months.

A recent meta-analysis showed that, despite studies showing early Cognitive recovery, a global deficit was still presents everal months after installation of abstinence and the cognitive profile tended to become normal only after 1year of abstinence, while certain residual cognitive impairments may persist. For example, the presence of visuo-spatial function deficits may be observed after several years of abstinence, related to the decreased volume of the right parietal cortex. [24,29]

Efficacy of Occupational Therapy-Cognitive remediation approach to maintain the function

Appropriate management of alcohol withdrawal is mandatory to prevent severe complications like delirium tremens or epileptic seizure. From Occupational Therapy perspective long-term abstinence is the main goal and cognitive behavioural therapy (CBT) and psychosocial programs are necessary. This is achieved using Model of Human occupation (MOHO) [30] which emphasizes on Physical and mental health of the individual. The model considers individual's personality traits, educational, sociocultural, economical background and plans treatment goals using concepts of Personal causation, values and interests, skill. The presence of cognitive impairments

requires substitution/adaptation approach for management of alcohol-dependent patients. Patients can be introduced to Occupational group therapy which includes orientation groups, activity groups, intra and interpersonal skills group, coping skills & family groups etc. Cognitive Behavioural Therapy has been demonstrated to be effective in the management of alcohol-dependence. [17,31]

The efficacy of CBT would therefore depend on the integrity of certain brain regions of interest. For example, it has been shown in schizophrenic patients that the volume of grey matter in the frontal, temporal (including hippocampus), parietal, and cerebellar regions, brain regions that are also damaged in alcohol-dependent patients, is predictive of the efficacy of management [18] Similarly, the integrity of the frontocerebellar network, a site of predilection for brain damage in alcohol-dependent patients, would play an essential role in the efficacy of CBT due to its role in executive functioning. [19]

However, various studies have shown that alcohol-dependent patients with the most severe cognitive impairment also have the least favourable prognosis. [20-22]

A recent study demonstrated that a cognitive remediation program was able to improve divided attention, alert capacities, working memory, and episodic memory. In addition to cognitive improvement, cognitive remediation therapy also improves other non-cognitive domains, especially psychological aspects (well-being, self-esteem) and craving. [23]

Thus, data published in the literature suggest that it is essential to take into account the cognitive dimension of alcohol-dependent patients in order to adapt their treatment and to palliate their difficulties in activities of daily living. The brain changes and the profile of cognitive impairments presented by patients with chronic excessive alcohol consumption have now been very extensively documented in the literature. The role of these changes on drinking behaviour, especially via the cognitive

processes involved in the mechanisms of addiction, also constitutes a rapidly growing new field of research. Finally, the impact of these impairments on the modalities and efficacy of the proposed management is a clinical problem systematically raised in research. The last domain to be developed in the field of management of alcohol-dependent patients is therefore that of cognitive remediation, which can establish the link between the various problems related to cognitive deficits in the clinical management of these patients in order to propose specific targeted follow-up in a remediation therapy program devoted to these impairments.

Effective palliative & preventive therapeutic strategies for Alcohol related dementia can bring about a change not only in patient's life but also his family. This helps in reducing the social burden of Alcohol dependence in community. [26,28]

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How to cite this article: Sawant P, Gokhale P. Brief review on alcohol related dementia; scope of occupational therapy. *Int J Health Sci Res*. 2019; 9(5):376-380.
