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Original Research Paper

Physiology

EVALUATING BMI AS A RELIABLE INDICATOR FOR ASSESSING SEVERITY OF ALCOHOLIC LIVER DISEASE: A DESCRIPTIVE CROSS SECTIONAL STUDY

Dr. Sarah Varghese Assistant Professor, Physiology Department, A.J. Institute of Medical Sciences, Mangalore.

ABSTRACT Alcohol abuse results in extensive liver damage and nutritional deficiency depending on duration of its consumption. This cross sectional study was conducted to assess Body Mass Index, in patients with alcoholic liver disease and to correlate the above parameters with the duration of alcohol consumption, if any. 50 patients, aged between 30 – 60 years, admitted with alcoholic liver disease to the Department of Medicine, A.J. Institute of Medical sciences, Mangalore and 50 controls from teaching and non-teaching staff in A.J. Institute of Medical Sciences are selected by simple random sampling technique. Anthropometric measurements like height, weight, are measured by standard methods and body mass index (BMI) is calculated. Patients with alcoholic liver disease had more incidence of BMI less than 18.5 and 18.5-22.9. BMI showed negative correlation with duration of consumption. Study concluded that BMI cannot be considered as a valid indicator for alcoholic liver disease.

KEYWORDS : Alcoholic liver disease; BMI; Alcoholism

INTRODUCTION

Excessive alcohol consumption among the world's young adults is a major global public health concern while the rising rate of those overweight in addition to obesity among the young is a growing concern. A clear association between alcohol consumption and weight gain has not been apparent based on the mixed, conflicting available evidence on the topic.

Although alcohol abuse and alcoholism are major health problems in many countries, the major medical and social impacts of alcohol abuse have not always been appreciated.¹ Many cases remain undetected, undiagnosed and untreated until they have progressed to a point of advanced or fatal organ damage. Progress will require effective preventive measures, early diagnosis and effective treatment. In particular, detection and diagnosis would be facilitated by biomarkers with high selectivity and specificity for alcoholism (rather than for liver damage); such markers might allow biological classification of subtypes of alcoholism.²

The definition of an alcoholic is usually taken to be an individual who consumes an amount of alcohol capable of producing pathology (Criteria Committee, National Council on Alcoholism, 1972). For most individuals this is an excess of 80 gm of ethanol per day.³

Malnutrition and vitamin deficiencies probably play roles in complications of alcoholism such as Wernicke's encephalopathy and Korsakoff's Psychosis.¹ Alcohol toxicity on the liver causes major morbidity and mortality.⁴Alcoholic Liver Disease is a clinical dilemma with important nutritional implications for weight management in addition to specific organ toxicity.⁵ This study is undertaken to evaluate influence of chronic alcohol abuse on body composition and to correlate it with the duration of alcohol consumption, if any.

MATERIALS AND METHODS

The study group comprised of 50 patients, diagnosed with alcoholic liver disease after fulfilling the necessary criteria, admitted to the Department of Medicine, A.J. Institute of Medical sciences, Mangalore. 50 controls were taken from teaching and non-teaching staff in A.J. Institute of Medical Sciences. Ethical clearance was obtained from Institute's Ethical Committee. Patients are enrolled in the study after taking written informed consent.

Criteria for selection of study group: Diagnosis was based on: ⁶ Thorough history including alcohol history

- 1) Detailed physical examination, searching for signs and symptoms of chronic liver disease
- 2) A liver chemistry profile (including serum albumin, serum bilirubin and serum transaminases, AST/ALT) should be done. A complete blood count and prothrombin time should be obtained to support a clinical suspicion of alcoholic liver disease.

INCLUSION CRITERIA:

 50 male patients with history of alcohol consumption, (those who consume more than 80gms of alcohol per day)⁷ aged between 30-60 years, who are admitted with alcoholic liver disease are selected by random sampling technique.

EXCLUSION CRITERIA:

 Females with history of liver injury like accidents, hepatobiliary surgery and interventions and malignancy

BMI was calculated as body weight divided by the squared value of height (kg/m²). Body weight as well as height measurements were taken using a stadiometer. Body weight was measured in the standing position while wearing minimal clothing, with height measured during inspiration. Cases and controls were classified based on Asian Indian classification of BMI⁸. Underweight < 18.5, Normal weight 18.5 – 22.9, Overweight/pre-obese 23–24.9 and Obesity> 25.

RESULTS:

Socio demographic details

- Out of 100 subjects selected for the study, 51, 27 and 22 subjects were within age group 30-40 years, 41-50 years and 51-60 years respectively.
- Mean age of cases studied is 45.68 ± 9.923 years.
- When subjects were grouped based on duration of alcohol consumption, 20 (40%), 23 (46%) and 7 (14%) cases consumed alcohol for 1-15 years, 16-30 years and 31-45 years respectively.

Body mass index distribution of subjects

Among subjects 13 cases (26%) and 1 control (2%) were classified underweight (BMI less than 18.5). 29 cases (58%) and 19 controls (38%) were found to be normal (BMI 18.5-22.9). 8 cases (16%) and 17 controls (34%) were classified overweight (BMI 23-24.9). There were no cases but 13 controls (26%) that fell into the obese category (BMI more than 25). These findings were significant (p < 0.001).

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Table 1: Association of DMI with ALD cases and controls								
BMI		ALD	cases	Controls				
		No.	Percent	No.	Percent			
Underweight (<18.5)		13	26	1	2.0			
Normal weight (18.5-22.9)		29	58.0	19	38.0			
Overweight/obese (23-24.9)		8	16.0	17	34.0			
Obesity (>25)		0	0	13	26			
Total		50	100	50	100			
$X^2 = 28.609 * *$	df = 3		P<0.01	าา				

Association of Body mass index and duration of alcohol consumption

Subjects who were classified underweight (BMI <18.5), 5 (25%), 5 (21.7%) and 3 (42.9%) cases consumed alcohol for 1-15 years, 16-30 years and 31-45 years respectively. Among those who were of normal weight (BMI 18.5-22.9), 11 (55%), 15 (65.2%) and 3 (42.9%) cases consumed alcohol for 1-15 years, 16-30 years and 31-45 years respectively. In those who were overweight (BMI 23-24.9), 4 (20%), 3 (13%) and 1 (14%) cases consumed alcohol for 1-15 years respectively. These findings were not significant (Table 4). Correlation analysis was done to assess the relationship between duration of consumption and BMI (r= 0.037) and the result was not statistically significant.

BMI	BMI 1-		16-30 Yrs		31-45 Yrs				
	No.	Percent	No.	Percent	No.	Percent			
Underweight (<18.5)	5	25.0	5	21.7	3	42.9			
Normal weight (18.5-22.9)	11	55.0	15	65.2	3	42.9			
Overweight /obese (23-24.9)	4	20.0	3	13.0	1	14.0			
Total	20	100	23	100	7	100			

Table 2: BMI with duration of alcohol consumption in cases

r = -0.037 p = 0.775 > 0.05

DISCUSSION

In our study, the incidence of BMI (kg/m²) in 4 groups; underweight (<18.5), normal weight (18.5-22.9), overweight (23-24.9) and obese (>25) were 13, 29, 8 and 0 cases respectively compared to 1, 19, 17 and 13 controls respectively and this was significant. This is comparable to study done by Addolorato G et al. ¹⁰ where alcoholics showed a significant lower body weight and a significant lower fat mass compared with controls. It can result from displacement of nutrient associated calories by the "empty" calories devoid of protein, vitamins, and minerals of alcohol, and/or a secondary nutritional deficiency due to injurious effects of alcohol on the liver, pancreas and intestine.¹¹

In our study, BMI negatively correlated with duration of alcohol consumption and was not significant. This is comparable to study done by Rosalind A et al. who also found that BMI was lower among ALD cases. This may be because they may compensate for energy derived from ethanol by eating less. Participants who consumed more than 25 percent of their total energy intake as ethanol (approximately six drinks or 625 kcal per day, assuming a 2,500-kcal/day diet) showed weight loss, possibly attributable to metabolism of alcohol by an alternate pathway, resulting in energy wastage.

Contrary to our study findings a study conducted among university students in Eastern Thailand reported a positive relationship between alcohol consumption and BMI. They also stated that the daily alcohol consumption is a risk factor for excessive weight and gender may contribute to the correlation¹⁶.

The incidence of malnutrition, whether of energy, protein, or mixed origin, in chronic alcoholics ranges from 5% to 40%.

Malnutrition has long been suspected to be an additional deleterious factor in the occurrence of alcohol induced organ damage—specifically, alcohol-induced liver disease, central and peripheral neurologic damage, pancreatitis, and infectious complications. In evaluating skeletal muscle, some observed that muscle strength was substantially weaker in alcoholic patients with advanced liver cirrhosis than in control subjects, and that the weakness was related to the severity of malnutrition but not to the severity of liver disease, duration of alcohol abstinence, or neuropathy.¹³

Chronic alcohol consumption increases the metabolic rate, which demands an inordinate increase in nutrient oxidation due to increased energy wastage. Therefore if the rate of nutrient supply is insufficient due to dietary deficiency or reduced net absorption, the nutrient reserve is the only source available from which to meet the deficient and the weight loss will result.¹⁴. BMI does not take into account the proportion of weight related to increased muscle mass or the distribution of excess fat within the body.¹⁵. Therefore, BMI cannot be used as a reliable indicator for assessing severity of alcoholic liver disease.

REFERENCES:

- Fleming M, Mihic SJ, Harris RA. Ethanol In: Brunton LL, Lazo JS, Parker KL editors. Goodman & Gilman's The Pharmacological Basis of Therapeutics. 11th ed. New York: McGraw-Hill; 2005.p. 591-604.
- Fleming M, Mihic SJ, Harris RA. Ethanol In: Hardman JG, Limbird LE editors. Goodman & Gilman's The Pharmacological Basis of Therapeutics. 10th ed. New York: McGraw-Hill; 2001.p. 429-43.
- CL Medenhall et al. Alcoholic hepatitis and cirrhosis. Clinics in Gastroenterology 1981; 10 (2): 417-452.
- Pequignot G, Cyrulink S. Chronic disease due to Overconsumption of Alcoholic Drinks. International Encyclopaedia of Pharmac and Therapeutics 1970; 2: 375-412.
- Falck-Ytter Y, McCullough AJ. Nutritional effects of alcoholism. Curr Gastroenterol Rep 2000; 2(4):331-6.
- McCullough AJ, O'Connor JF. Alcoholic liver disease: proposed recommendations for the American College of Gastroenterology. Am J Gastroenterol 1998; 93(11):2022-36.
- Jones AL, Karalliedde L. Poisoning. In: Boon NA, Colledge NR, Walker BR, Hunter JAA editors. Davidson's Principles and Practice of Medicine. 20th ed. Edinburgh: Elsevier; 2006.p.235.
 NHANES - NHANES 2007- 2008- Manuals, Brochures and Consent
- NHANES NHANES 2007- 2008- Manuals, Brochures and Consent Documents. NHANES, Anthropometry Procedures Manual http://www.cdc. gov/nchs/nhanes/nhanes2007 2008/current_nhanes_07_08.htm (last accessed 10 October 2012).
- Misra A, Chowbey P, Makkar BM, Vikrm NK, Wasir JS, Chandha D, et al. Consensus statement for diagnosis of obesity, abdominal obesity and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical and surgical management. J Assoc Physicians India 2009; 57: 163-70.
- Addolorato G, Capristo E, Greco AV, Stefanini GF, Gasbarrini G. Influence of chronic alcohal abuse on body weight and energy metabolism: is excess ethanol consumption a risk factor for obesity or malnutrition? J Intern Med 1998; 244(5):387-95.
- Rossi MA. Alcohol and malnutrition in the pathogenesis of experimental alcoholic cardiomyopathy. J Pathol 1980; 130(2):105-16.
 Breslow RA, Smothers BA. Drinking patterns and body mass index in never
- Breslow RA, Smothers BA. Drinking patterns and body mass index in never smokers: National Health Interview Survey, 1997-2001. Am J Epidemiol 2005; 161(4):368-76.
- Nicolás JM, García G, Fatjó F, Sacanella E, Tobías E, Badía E, Estruch R, Fernández-Solà J. Influence of nutritional status on alcoholic myopathy. Am J Clin Nutr 2003;78(2):326-33.
- Thomson AD, Jeyasingham MD, Pratt OE. Possible role of toxins in nutritional deficiency. Am J Clin Nutr 1987; 45: 1351-60.
- Dalton M, Cameron AJ, Zimmet PZ, Shaw JE, Jolley D, Dunstan DW et al., Waist circumference, waist-hip ratio and body mass index and their correlation with cardiovascular disease risk factors in Australian adults. J Intern Med 2003; 254(6):555-63.
- Booranasuksakul U and Rueangsri N. Association between Alcohol Consumption and Body Mass Index in University Students. Asian Pac Isl Nurs J. 2019;4(1):57-65.