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Original Research Article

Title: To evaluate the possible oxidative stress and inflammatory markers, in newly type 2 diabetes mellitus patients with reference to alcohol.

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Abstract

Background & Methods: The aim of the study is to evaluate the possible oxidative stress & inflammatory markers, in newly type 2 diabetes mellitus patients with reference to alcohol. All the plain & fluoride samples were centrifuged at 3000rpm for 5min to obtain clean serum/plasma. Investigation like blood glucose, lipid profile, HbA1c was performed on the same day of collection. The remaining investigations like serum cytokines, hs-CRP, insulin etc. were done later. Serum samples stored at -20ºC till analysis.

Results: Mean Inflammatory Markers of group A alcoholic were significantly associated ($p<0.05$). Mean Inflammatory Markers of group B non-alcoholic were significantly associated ($p<0.05$). Mean Diabetic profile & Pancreatic Test of group A alcoholic were significantly associated ($p<0.05$) Mean Diabetic profile & Pancreatic Test of group B non-alcoholic were significantly associated ($p<0.005$).

Conclusion: T2DM is frightful & multifarious disease. The results draw our attention towards the fact that a substantial urgent plan is necessary when planning diagnosis of the patient's health status. Primary prevention of T2D should be an urgent public health policy. Lifestyle modification may be a promising approach in T2D complications. High levels of inflammatory markers have been recorded in newly diagnosed alcoholic patients.

Keywords: oxidative, stress, inflammatory, diabetes mellitus & alcohol.

Study Design: Observational Study.

Introduction

Various studies have been done to attempt to estimate the prevalence of diabetes in India ICMRINDIAB study estimated the overall prevalence of diabetes in India to be 7.3% & the prevalence of prediabetes to be 10.3% (WHO criteria) or 24.7% (ADA criteria) [1]. The main factors driving the diabetes epidemic in both urban & rural areas of India are obesity, age & family history of diabetes.

According to newly released IDF Diabetes Atlas, 8th edition (2017), the national prevalence for diabetes (20-79 years) in India is estimated to be 8.8% [2]. In India life-style changes associated with rapid urbanization, mechanized transportation, increased consumption of

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processed foods & physical inactivity are fuelling the epidemic. A review of studies in rural India found that the prevalence rates of impaired glucose tolerance (IGT, a form of pre-diabetes) range from 5.5% to 7.2% [3]. Such figures are concerning, especially considering 72.2% of the Indian population live in rural areas characterized by poverty, isolation & poor access to health services[4].

DM, a life style disease increasing at an alarming rate, is one of the most common noncommunicable diseases of current era [5]. The burden of this disease is immense owing to transition in lifestyle & dietary habits, ageing of the population & urbanization in the setting of a genetically predisposed environment []. Various facts probably reflects the higher susceptibility of Asian Indians to diabetes. Since the urban poor also have this higher genetic susceptibility, they seem to develop diabetes when the environmental factors become favorable. These factors include weight gain with increased food intake & reduced physical activity[6-9].

Material & Methods

Present study was conducted at Index Medical College Hospital & Research Centre, Indore for 01 Year sample size of 50 in each group, after obtaining prior consent, venous blood were taken from the subjects under aseptic conditions by venipuncture using sterile disposable syringe & needle. 7ml blood collected was taken in plain tube & kept for 30 minutes for clotting. 2ml blood was collected in fluoride bulb for blood glucose. 1ml blood was collected in EDTA bulb for HbA1c estimation.

Inclusion Criteria:

1. 100 newly diagnosed T2D, non-alcoholic males subjects aged 35 – 55 years.

2. 100 newly diagnosed T2D, alcoholic male subjects aged 35 – 55 years

3. Males smoking 5 or less cigarettes/bidies per day.

Exclusion Criteria:

1. All acute & chronic infections & inflammatory conditions such as pneumonia, HIV infections, tuberculosis, malignancies, kidney & liver disease.

2. Patients on medication, which may alter the study parameters.

3. Males smoking 5 or more cigarettes/bidies per day

4. Subjects diagnosed with type 1 diabetes

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Result

Table No. 1: Oxidative stress

	Serum MDA (mmol/l)	Serum NO (mmol/l)	P Value
Group A (NDDS) Alcoholic	3.82±0.8	13.47±1.7	<0.0001
Group B (NDDS) Non-Alcoholic	2.39±1.86	11.24±2.19	<0.0001

Mean Oxidative stress of Group A alcoholic were highly significantly associated ($p < 0.0001$). Mean Oxidative stress of group B non-alcoholic were highly significantly associated ($p < 0.0001$)

Table No. 2: Inflammatory Markers

	IL-1 (ng/microl)	IL-6 (ng/microl)	IL-8 (ng/microl)	IL-10 (ng/microl)	hs-CRP (mg/l)	P Value
Group A (NDDS) Alcoholic	0.68±0.2	0.64±0.2	0.52±0.3	0.69±0.2	2.73±1.7	0.031
Group B (NDDS) Non-Alcoholic	0.59±0.19	0.54±0.14	0.64±0.17	0.49±0.13	2.06±1.2	0.046

Mean Inflammatory Markers of group A alcoholic were significantly associated ($p<0.05$). Mean Inflammatory Markers of group B non-alcoholic were significantly associated ($p<0.05$)

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Table No. 3: Diabetic profile & Pancreatic function test

	Fasting blood glucose (mg/dl)	Insulin (U/L)	Cpeptide (ng/ml)	HbA1c (%)	Lipase (U/L)	Amylase (U/L)	P Value
Group A (NDDS) Alcoholic	191.67±10.73	14.32 ± 6	0.62 ± 0.2	8.33 ± 1.3	32.94 ± 5.2	58.55 ± 9.2	0.023
Group B (NDDS) Non-Alcoholic	173.35 ± 9.9	17.07 ± 7.1	0.78 ± 0.2	7.37 ± 1.3	28.50 ± 4.5	50.77 ± 8	0.048

Mean Diabetic profile & Pancreatic Test of group A alcoholic were significantly associated ($p<0.05$) Mean Diabetic profile & Pancreatic Test of group B non-alcoholic were significantly associated ($p<0.005$).

Discussion

Impaired glucose metabolism, insulin resistance & vascular complications have been shown to result from increased oxidative stress & excess ROS in patients with T2DM, & it has been speculated that antioxidant therapy may be beneficial in these patients. One antioxidant that could have applications in improving glycemic control & reducing cardiometabolic risk is water-soluble vitamin C [10]. It has been suggested that the chronic intake of vitamin C in high doses (_1 g/day) may improve glucose metabolism & increase insulin sensitivity in people with T2DM [11-12].

Mason et al. [13] conducted a meta-analysis to evaluate the effectiveness of vitamin C supplementation in reducing oxidative stress & controlling glycemic variability in patients with T2DM. The study found that vitamin C could have a beneficial effect on the course of the disease by lowering HbA1c, fasting blood glucose, postprandial blood glucose & oxidative stress markers such as MDA, among others. However, due to the heterogeneity between studies & the imprecision of the results, this conclusion can be considered hesitant. Moreover, a factor limiting the reliability of the results is that the studies tended to be short (<6 months) & were conducted on too few participants. It appears that vitamin C may be an inexpensive & readily available adjunct to the treatment of T2DM; however, further studies conducted for a longer duration with larger numbers of patients are needed. Mason et al. [14] suggest that those taking vitamin C regularly & those with higher HbA1C in the study may benefit most from supplementation. Another study, also conducted by Mason et al., examined the effects of high-dose ascorbic acid (AA) supplementation on skeletal muscle insulin sensitivity & markers of oxidative stress in the same group of patients. This study showed that the use of high doses of AA led to a significant improvement, up to 60%, in insulin-stimulated glucose disposal delta rate of glucose disappearance (DRd) during the four month supplementation[15].

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Conclusion

The study results conclude that lifestyle modifications & alcohol abuse is the main reason for increasing the complications caused by T2D, this indicates that the lifestyle modifications is a must which proves to be more effective, cheaper & safer way & provides sustainable benefits.

However, T2DM is frightful & multifarious disease. The results draw our attention towards the fact that a substantial urgent plan is necessary when planning diagnosis of the patient's health status. Primary prevention of T2D should be an urgent public health policy. Lifestyle modification may be a promising approach in T2D complications. High levels of inflammatory markers have been recorded in newly diagnosed alcoholic patients.

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