IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 7 Ver. 4 (July. 2018), PP 15-16
www.iosrjournals.org

Study of Vitamin D, Lipid Profile and Glycosylated Haemoglobin in Diabetic Patients

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Abstract-*Diabetes Mellitus is a chronic metabolic disorder primarily defined by hyperglycemia giving rise to a risk of Microvascular damage eg. retinopathy, nephropathy, neuropathy and Macrovascularеg. ischaemic heart diseases, stroke etc that are associated with reduced life expectancy&increased morbidityin long duration. Recent studies about global prevalence of diabetes indicate that there were 422 million people in world with Diabetes in 2016 and it is projected to be doubled by 2030**.(1)***

Keywords- *Cholecalciferol, Glycosylated Haemoglobin, Dyslipidemia*

Date of Submission: 27-06-2018 Date Of Acceptance: 12-07-2018

I. Introduction-

Vitamin D is a group of fat soluble secosteroids playing major role in absorbing calcium, magnesium and phosphate.Vitamin D deficiency may affect glucose homeostasis,Vitamin D levels having been found to be inversely related to glycosylated haemoglobin levels in gestational diabetes.Worldwide prevalence of vitamin D deficiency in elderly is 50% and within Europe in 2-30% of adults.Extraskeletal role of 25(OH)Cholecalciferol is currently under research. Autoimmune diseases eg multiple sclerosis, Rheumatoid Arthritis, Type1 Diabetes are under study. Vitamin D has been shown to be related to glucose metabolism and DM type II and metabolic syndrome.

II. Material &Methods-

This is a study carried out in aTertiary care AtishayHospital during a periodof three months.Patients clinically diagnosed as diabetics were included in the study.Blood samples were collected and GlycosylatedHaemoglobin, Vitamin D and Lipid Profile levels were determined. All the desired data were collected, summarized and analysed with keeping in view,the clinical features and duration of disease.

Glycosylated haemoglobin(HbA1c) assay was performed by High Performance Liquid Chromatographyand the diagnostic levels according to WHO is < 6.5% considered Normal . Impaired fasting levels 5.7-6.4 % .Levels 6.1-7% show good glycemic control,7.1-8 5% show fair glycemic control and > 8 .1 are supposed to have poor glycemic control.

25 OH Cholecalciferol was perfomed by Fully Automated ChemiLumenescent Immunoassay and the deficiency was said to be when levels were less then 20 ng/ml. 20-30 ng/ml were labelled as Insufficient.31-100ng/ml is considered as sufficient and more then 100 ng/ml indicates Toxicity

Lipid Profile comprised of determination of Total cholesterol, Triglycerides and HDL cholesterol doneby colorimetric method by endpoint reaction method.

Reference ranges as per NCEP guidelines for Total Cholesterol 125- 200 mg/dl,Triglycerides 25 -200 mg/dl, the HDL levels range between 35-60mg/dl.

III. Results

In our study we considered total 61 patientsin a duration of 3 months .41 patients were males {67.2 1%} whereas rest i.e. 20 {3 2.7 8% } were females. Males fall in age group 30-82 and females belong to 30-65 years of age.

Vitamin D levelwere assayed and out of 61 patients 39{63.9 3%}found to be **deficient**.Among the deficient patients 26 {42.6 2% } were males and 13{21.3 1% }females .Other category included levels between 20-30 ng/ ml categorised as **insufficient** and only 8 patients among all had **sufficient** vitamin D levels in the serum.

Glycosylated hemoglobin (HbA1C) was done by High performance liquid chromatography HPLC method.Patients who had less then 6 were considered having **verygood control**, these patients were 16 in number -10 were males,whereas 6 were females.Levels between 6.1- 7% was showing as having **good control** and10 patients lie in this category. Levels between 7.1-8 % included 9 patients who show **fair glycemic control**

where as levels above 8 % had **poor glycemic control** ,severely diabetic and few of them were having complications also .Among this category 20 were males and 6 were females.

IV. Discussion

Diabetes mellitus is a fast gaining status of potential epidemic in **India** with more than 62 million currently diagnosed cases with expected 79.4 million in India by 2030**(3).**Vitamin D is a group of fat soluble Secosteroids playing major role in absorbing Calcium,Magnesium and Phosphate.Most important compounds are Vitamin D3 cholecalciferol and D2 Ergocalciferol.Major source of vitamin D is synthesis in skin from cholesterol through a chemical reaction depending on exposure to sunlight**(4)** In general vitamin D is found in fungi and in animals. Animals source includes fish, liver oil, cod liveroil Salmon fish,Tuna fish etc. Vitamin D deficiency leads to Osteomalacia in adults,Rickets in children.Latest studies on extraskeletal role of Vitamin D have raised considerable interest vitamin D deficiency andits effects on glucose homeostasis.Vitamin D levels having been found to be inversely related to glycosylated hemoglobin levels in gestational diabetes mellitus. Worldwide prevalence of vitamin D deficiency in elderly is 50% and within Europe 22- 30% of adults**(5).**In some recent studies higher levels of Vitamin D had shown to be associated with favourable lipid profile where is low levels of Vitamin D associated with atherogenic lipid profile**(6)**

Dyslipidemia according to WHO is definedas the presence of one or more of the following- Total cholesterol more than 200 mg/dl, Triglycerides more than 150 mg/dl, HDL cholesterol below 40mg/dl, and VLDL more than 30 mg/dl. Low levels of Vitamin D is related with unfavorable effects on Lipid levels and also associated with higher levels of Total cholesterol with lower apolipoprotein A1 concentration in Belgian man.Vitamin D deficiency appears to be related to the development of diabetes mellitus type 2**(7)** Mild to moderate Vitamin D insufficiency has been proposed as a risk factor for the type 2 Diabetes mellitus **(8)**

V. Conclusion

Our study establishes the association of altered Vitamin D levels, Cholesterol,Triglycerides and HDL levels and the glycemic control in clinicallylabelled diabetic patients,To understand the complications so as to prevent the morbidity and mortality of the patients.Our study also aims at better understanding the correlation between Cholecalciferol levels and the dyslipidemia existing in the diabetic patients.Glycosylated haemoglobin levels very well show the glycemic control over a period of 6 to 8 weeks among the diabetic patients so a great follow up of the patients taking medication can be done.Any complications can be better understood and intervened at time.

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Dr.Nitin Jain MD " Study Of Vitamind , Lipid Profile And Glycosylated Haemoglobin In Diabetic Patients."IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 7, 2018, pp 15-16.