

THE RELATIONSHIP BETWEEN VITAMIN D AND NON-ALCOHOLIC FATTY LIVER DISEASE IN TYPE 2 DIABETIC EGYPTIAN PATIENTS

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INTRODUCTION AND OBJECTIVES

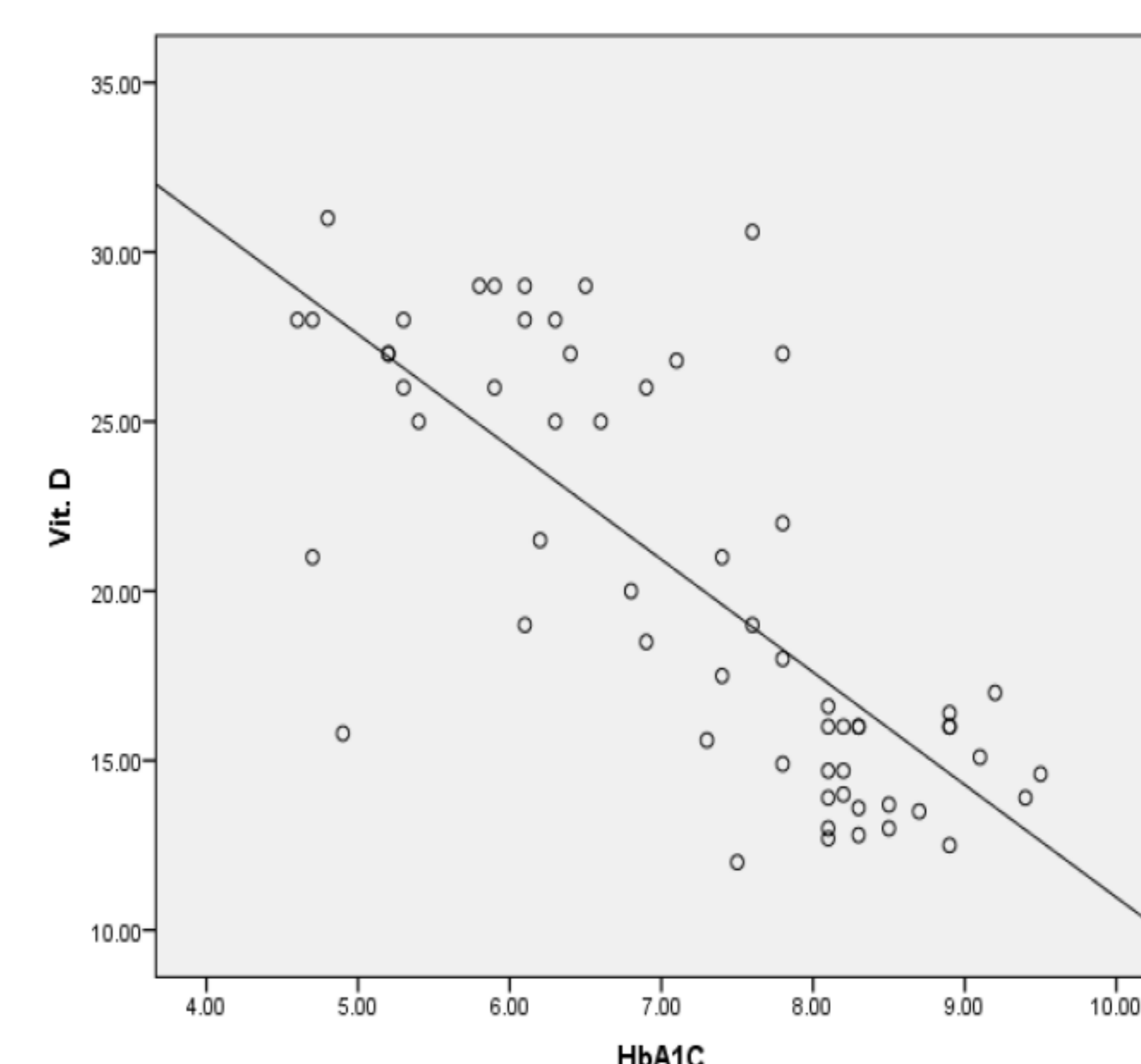
- Diabetes mellitus, hypovitaminosis D, and non-alcoholic fatty liver disease (NAFLD) are common medical conditions that share some risk factors, one of which is obesity¹.
- Both NAFLD and vitamin D deficiency have been linked to the development of metabolic syndrome and type 2 diabetes².
- The aim of this study is to evaluate the level of serum 25-hydroxy vitamin D [25(OH)D] in type 2 obese diabetic Egyptian patients with variable degrees of hepatic steatosis.

METHODS

- Sixty type 2 obese diabetic patients with normal liver functions were recruited in this cross-sectional study. Exclusion criteria were the presence of hepatitis B or C infection and clinical evidence of chronic liver disease.
- Body mass index (BMI), glycosylated haemoglobin (Hb A_{1C}), aspartate aminotransferase (AST), alanine aminotransferase (ALT), gamma glutamyltranspeptidase (GGT), lipid profile, and 25(OH)D were measured.
- Liver steatosis was assessed semi-quantitatively by ultrasound on a scale of 0-3 on the basis of abnormally intense, high level echoes arising from the hepatic parenchyma, liver-kidney difference in echo amplitude, echo penetration into deep portion of the liver and clarity of liver blood vessel structure into: 0 = absent; 1 = mild; 2 = moderate; 3 = severe³.

RESULTS

- 55% of patients had 25(OH)D deficiency with a mean of 15.21 (\pm 1.91) and 45% had normal 25(OH)D with a mean of 26.33 (\pm 2.97). 20% of patients had no evidence of steatosis by ultrasound, 23% had mild steatosis, 30% had moderate steatosis and 27% had severe steatosis.
- There was a significant negative correlation between 25(OH)D and age, $p=0.027$; Hb A_{1C}, $p=0.000$; triglycerides (TG), $p=0.022$ and degree of steatosis, $p=0.047$. 25(OH)D showed a significant positive correlation with high density lipoproteins (HDL), $p=0.046$. ANOVA showed a significant association between the degree of steatosis and BMI, $p=0.000$.
- Using multivariate analysis Hb A_{1C} was the only significant predictor for vitamin D level when tested with BMI and duration of diabetes, $p=0.000$.
- Patients were divided into 2 subgroups according to 25(OH)D level; group 1 had normal levels, group 2 were deficient in 25(OH)D. There was a significant difference between both groups as regards age, $p=0.035$; HbA_{1C}, $p=0.000$; TG, $p=0.004$; and HDL, $p=0.028$, with vitamin D deficient patients showing higher age, higher HbA_{1C}, higher TG and lower HDL levels. The two groups did not differ significantly as regards the grading of hepatic steatosis, nor the BMI.



Graph showing a significant negative correlation between 25(OH)D and Hb A_{1C}, $p=0.000$.

CONCLUSION

- More than half of our patients had 25(OH)D deficiency. Our results show an association between vitamin D deficiency and some markers of the metabolic syndrome in the form of a significant correlation between 25(OH)D and TG and HDL levels.
- However, we found no difference between patients with normal 25(OH)D and those deficient in it regarding BMI. This may be attributed to the fact that all of our patients were obese with a BMI above 30.
- Poor glycemic control was associated with lower levels of 25(OH)D independent of BMI and duration of diabetes. More extensive randomized controlled trials are needed to establish a cause-effect relationship between these 2 factors.
- Routine measurement of vitamin D should be advocated in diabetic patients, and until causal relationship between vitamin D deficiency and glycemic control is established current guidelines for vitamin D supplementation should be followed.
- One of the limitations of this study is that an estimate of the daily intake of vitamin D and sun exposure was not assessed, especially with more than half of our patients being peri-menopausal females.

REFERENCES

1. Kwok, RM; Torres DM; and Harrison SA (2013). Vitamin D and nonalcoholic fatty liver disease (NAFLD): is it more than just an association? *Hepatology*, 58: 1166-1174.
2. Williams, KH; Shackel, NA; Gorrell, MD et al. (2013). Diabetes and nonalcoholic fatty liver disease: a pathogenic duo. *Endocrine Reviews*, 34(1): 84 -129.
3. Saverymuttu, SH; Joseph, AEA; Maxwell, JD (1986). Ultrasound scanning in the detection of hepatic fibrosis and steatosis *Clinical Research*, 292 : 13-15

