

A Study in Total Vitamin D Assay

Salwa Al-Refaee* and Mohammad Hattab

Clinical Biochemistry, J. A. Armed Forces Hospital, Ministry of Defense, Kuwait

Introduction

A renewed interest in vitamin D reflects almost the high prevalence of vitamin D deficiency worldwide and the increased publication connecting its deficiency to other clinical conditions other than bone health [1]. Therefore, the combination of total vitamin D levels with other tests should be considered when studying certain clinical conditions such as bone diseases and diabetes mellitus [2]. In most assays underestimation of the vitamin levels observed even with the new measurement of total vitamin D (D3+ D2) assay [1,3]. Also reference range for the vitamin around 50 nmol/l was established that is increased as you reach the equator due to increased sun exposure [2]. Assay provided in our country uses 75 nmol/l as reference range, regardless the fact that different assays will produce different results. We studied total vitamin D using two different assays (Roche and diaSorin).

Method

We tested total vitamin D results in randomly selected 243 patients attending J.A. armed forces hospital. Total vitamin D levels were measured for the samples using two different instruments located at two different hospitals. The Demo LIAISON, diaSorin at our hospital and ROCHE, COBAS 6000 in MOH hospital. We studied the link between serum total vitamin D levels and levels of serum calcium, parathyroid hormone, glucose, HbA1c all measured at J.A. armed forces hospital. 42 healthy volunteers "laboratory staff and their relatives" that do not complain from any bone or vitamin D deficiency symptoms were tested for the total vitamin D to establish laboratory reference range. 3 subjects were excluded for receiving either vitamin D injections or 50,000 unit's vitamin D tablets. Volunteers with ages varied from 26-50 years old and their samples withdrawn in foil covered plain tube and analyzed as soon as possible using ROCHE, COBAS 6000 analyzer. Statistics were calculated using SPSS 21 package.

Results and Discussion

Descriptive statistics for whole population involved that include 41 males and 202 females are shown in the table below. No statistically significant difference was found in total vitamin D levels between both sexes (Mann-Whitney; $P=0.6$). LIAISON and COBAS total vitamin D levels correlated significantly ($P=0.001$, $R^2=0.87$; linear regression). No correlations (spearman) were found between total vitamin D, Calcium ($P=0.9$), PTH ($P=0.4$), Glucose ($P=0.6$) or HbA1C ($P=0.2$) (Table 1).

Healthy volunteers showed reference range 26.7-90 nmol/l. Similarly no significant difference in the distribution of total vitamin D was found between both sexes (Mann-Whitney $P=0.17$) as shown in Figure 1.

Conclusion

Measurement of total vitamin D alone provides crude assessment

Variables	Total vitamin D nmol/l	Calcium mmol/l	glucose mmol/l	PTH pmol/l	HBA1c %
Median	22.3	2.3	5.4	7.1	26.4
25% I.Q.R	19.03	2.2	5	6.2	17.8
75% I.Q.R	58.1	2.4	6.5	9.1	60.8

Table 1: Difference in total vitamin D medians between both sexes in reference group (male=0, female=1).

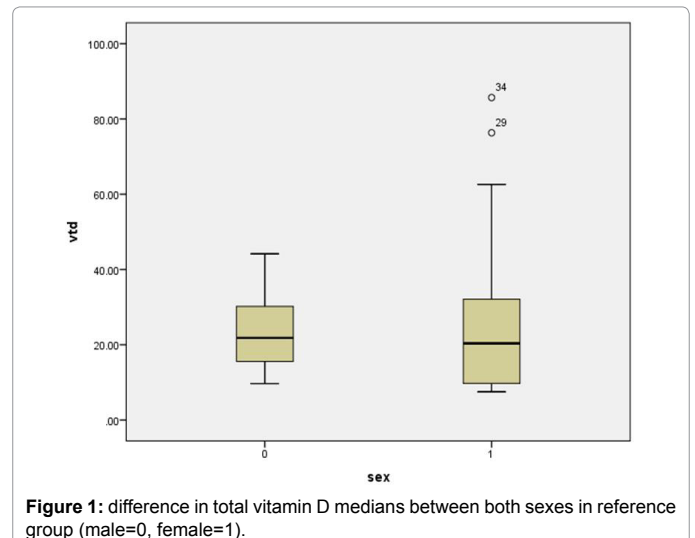


Figure 1: difference in total vitamin D medians between both sexes in reference group (male=0, female=1).

of its status but may give inaccurate indication of its deficiency effect on certain clinical conditions. Further studies needed. Reference ranges for vitamin D assay should be revised according to each assay until assay standardization become available.

References

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*Corresponding author: Salwa AL Refaee, Clinical Biochemistry, J. A. Armed Forces Hospital, Ministry of Defense, Kuwait, Tel: 0096597601407; E-mail: alrefaee.salwa@gmail.com

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