

# VITAMIN D DEFICIENCY IN PATIENTS WITH MYOCARDIAL ISCHEMIA

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# Abstract

**Introduction:** Myocardial perfusion imaging (MPI) single photon emission computer tomography (SPECT) is a reliable imaging method for diagnosis of myocardial ischemia.

**Purpose:** The purpose of this retrospective study was to use MPI SPECT in order to investigate the role of Vitamin D (VD) deficiency in myocardial ischemia.

**Methodology:** A 4-year search in our database found 62 patients who had both MPI SPECT and VD measurement. MPI SPECT were performed visually and summed scores over the 17 myocardium segments were evaluated separately for stress (SSS) and rest (SRS) images. Vit D was determined by radioimmunoassay (RIA). Abnormal MPI SPECT was considered when SSS was  $\geq 4$ . Patients with VD values  $< 10$  ng/ml,  $10 - 29$  ng/ml and  $\geq 30$  ng/ml were defined as having deficiency, insufficiency, and sufficiency respectively.

**Results:** Among patients, 27/32 (44%) were males and 35/32 (56%) were females. Half patients had abnormal MPI 31/62 (50%). VD was  $< 10$  ng/ml in 15/62 (24%) and  $\geq 10$  ng/ml in 47/62 (72%) ( $p=0.0003$ ). Only one patient was found with VD sufficiency. There were 12/15 (80%) patients with both Vit D deficiency and abnormal MPI SPECT, and 19/47 (40%) patients with Vit D  $\geq 10$  ng/ml and abnormal MPI SPECT ( $p=0.002$ ).

**Conclusions:** Twenty four percent of all patients subjected to MPI SPECT for myocardial evaluation had Vit D deficiency. Most of these patients (80%) in addition to vitamin D deficiency had abnormal MPI SPECT. Thus, Vit D deficiency seems to play a role in coronary artery involvement and can be a prognostic marker for myocardial ischemia.

**Keywords:** Vitamin D, myocardial perfusion imaging, myocardial ischemia

# Purpose

Vitamin D deficiency is a highly prevalent condition, present in approximately 30% to 50% of the general population. (1)

Epidemiologic studies have associated low 25-hydroxyvitamin D levels with coronary risk factors and adverse cardiovascular outcomes. (1)

In addition to traditional cardiovascular risk factors, vitamin D deficiency looks to be independent predictor of coronary artery disease severity including percent stenosis, number of the affected vessels as well as degree of coronary calcification. (2)

Furthermore, low serum vitamin D is an independent risk factor for developing acute myocardial infarction. (3)

The purpose of this retrospective study was use MPI SPECT in order to investigate the role of Vit D deficiency in myocardial ischemia.

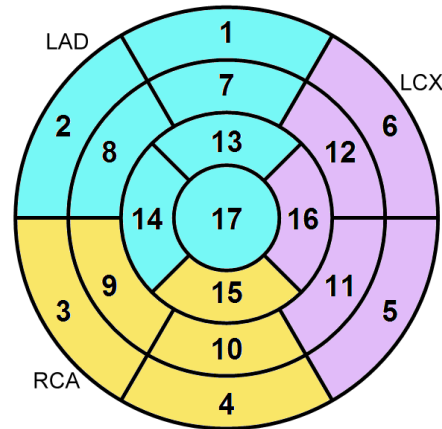
# Methodology

A 4-year search in our database found 62 patients who had both MPI SPECT and Vit D measurement.

MPI SPECT were performed visually and summed scores over the 17 myocardium segments were evaluated separately for stress (SSS) and rest (SRS) images. (Figure)

Vit D was determined by radioimmunoassay (RIA).

Abnormal MPI SPECT was considered when SSS was  $\geq 4$ . Patients with Vit D values  $< 10$  ng/ml,  $10 - 29$  ng/ml and  $\geq 30$  ng/ml were defined as having deficiency, insufficiency, and sufficiency respectively.



# Results 1

Among patients, 27/62 (44%) were males and 35/62 (56%) were females.

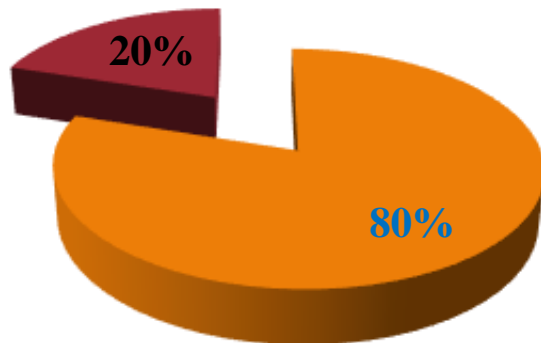
Half patients had abnormal MPI 31/62 (50%).

Vit D was  $< 10$  ng/ml in 15/62 (24%) and  $\geq 10$  ng/ml in 47/62 (76%)  
( $p=0.0003$ ).

Only one patient was found with Vit D sufficiency.

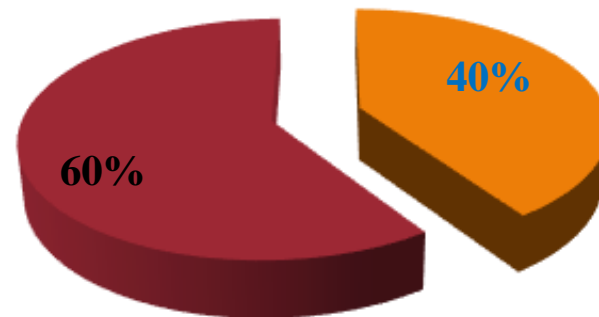
There were 12/15 (80%) patients with both Vit D deficiency and abnormal MPI SPECT (Figure 1), and 19/47 (40%) patients with Vit D  $\geq 10$  ng/ml and abnormal MPI SPECT ( $p=0.0002$ ) (Figure 2).

**Figure 1**



$p=0.0002$

**Figure 2**



## Discussion

VD deficiency activates the renin-angiotensin-aldosterone system and can predispose to hypertension and left ventricular hypertrophy.

Additionally, VD deficiency causes an increase in parathyroid hormone, which increases insulin resistance and is associated with diabetes, hypertension, inflammation, and increased cardiovascular risk.

Epidemiologic studies have associated low 25-hydroxyvitamin D levels with coronary risk factors and adverse cardiovascular outcomes. (1)

VD deficiency may be the cause of subclinical myocardial dysfunction in patients with or without diabetes mellitus and no history of significant coronary artery disease. (4)

Twenty four percent of all patients subjected to MPI SPECT for myocardial evaluation had VD deficiency. Most of these patients (80%) in addition to VD deficiency had abnormal MPI SPECT. Thus, VD deficiency seems to play a role in coronary artery involvement and can be a prognostic marker for myocardial ischemia.

## Conclusions

Twenty four percent of all patients subjected to MPI SPECT for myocardial evaluation had Vit D deficiency.

Most of these patients (80%) in addition to vitamin D deficiency had abnormal MPI SPECT.

Vit D deficiency seems to play a role in coronary artery involvement and can be a prognostic marker for myocardial ischemia.

## References

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