

**Title:** Impact of Type II Diabetes Mellitus on Left Ventricular Systolic Function assessed by 2D Speckle Tracking with 4D Echocardiography and MUGA scan in Patients with Negative Myocardial Perfusion Imaging (MPI)

**Category:** Heart Failure and Cardiomyopathies

### Abstract

**Background:** Type 2 diabetes mellitus (T2DM) is a common chronic disorder in adolescence. Myocardial involvement in T2DM has been proved as subclinical LV and RV systolic dysfunction. Speckle tracking (ST) and 4D echocardiography hold a promise to be more reliable indexes of "myocardial performance " in patients with DM. The MUGA scan provides a more accurate representation of cardiac ejection fraction.

**Aim of the Work:** To assess the impact of type II diabetes mellitus on left ventricular systolic function in patients with negative myocardial perfusion imaging (MPI) by using, 2D speckle tracking (ST ) 4D echocardiography and MUGA scan

**Patients and methods:** The study was conducted in cardiology department of Al Zahraa University hospital. It included 30 patients with T2DM group I (25 (83%) female & 5 (16%) male with mean age  $48.40 \pm 7.44$ ), whom stress (MPI) was proved to be negative. And 15 apparently healthy age and sex matched subjects as a control group group II (11 (73 %) female & 4 (26%) male with mean age  $50.20 \pm 7.74$ ), group I further subclassified into A, B & C according to MUGA, LV-GLS and 4D LVEF respectively. LV systolic function was evaluated using conventional, TDI, 2D STE (LV-GLS), 4DE and MUGA scan.

**Results:** The diabetic group showed statistically highly significant reduction in LV-GLS ( $-18.07 \pm 2.73$  in group I VS  $-21.24 \pm 1.29$  in group II,  $P < 0.001$ ), 4D LVEF ( $52.30 \pm 5.28$  in group I VS  $58.93 \pm 4.69$  in group II,  $P < 0.001$ ). We found an agreement between three modalities (speckle tracking, 4D echocardiography and MUGA scan) by 33% in 10 patients (3 patients (10%) are impaired function and 7 patients (23%) are preserved by all modalities ). Also there was an agreement between two modalities (speckle tracking & 4D echo) by 76.6% in 23 patients (16 patients (53.3%) are impaired function and 7 patients (23.3%) are preserved one).

**Conclusion:** T2DM is associated with subclinical left ventricular systolic dysfunction that can be assessed by different non-invasive modalities (2D speckle tracking, 4D echocardiography and MUGA scan). New non invasive modalities like speckle tracking and 4D echocardiography might be more powerful than MUGA scan in the detection of subclinical left ventricular systolic dysfunction, for further evaluation.