

# VALUE OF SPECKLE TRACKING ECHOCARDIOGRAPHY IN LEFT VENTRICULAR REVERSE REMODELLING ASSESSMENT IN REVASCULARIZED PATIENTS WITH CHRONIC TOTAL OCCLUSION

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## Introduction

Coronary chronic total occlusion (CTO) is interruption of antegrade coronary flow with TIMI grade 0 flow for equal or more than three months with incidence up to 16-18% among patients with coronary artery disease. Revascularization procedures aim to improve the patient's quality of life, exercise capacity and left ventricular function. Assessing the longitudinal myocardial deformation using 2D speckle tracking echocardiography is beneficial method to predict the subclinical recovery of hibernating viable myocardium after CTO percutaneous coronary intervention (CTO-PCI).

## Aim of the Work

The aim of present study was to evaluate the value of 2D-STE in assessment of left ventricular reverse remodeling in patients with CTO who underwent revascularization through percutaneous coronary intervention (PCI). The assessment was conducted immediately after the procedure and three months later.

## Subjects and Methods

This study included 54 patients who presented to Alexandria Main University Hospitals with chronic coronary total occlusion treated by PCI and evaluate LV reverse remodeling immediately after and 3 months after revascularization using 2D speckle tracking echocardiography.

## Results

The studied patients, 74.1% were males; with the mean age was  $56.65 \pm 7.65$  years. After CTO PCI intervention there was significantly improvement in mean 2D LVESV (from  $45.20 \pm 12.60$  ml to  $40.83 \pm 16.22$ ml) ( $p < 0.001$ ), and mean 2D LVEF (from  $53.91 \pm 7.58\%$  to  $57.81 \pm 7.82\%$ ) ( $p < 0.001$ ) but did not affect 2D LVEDV.

2D-STE mean GLS (global longitudinal strain) improved from  $-13.38 \pm -4.12$  early to  $-15.94 \pm -3.92$  post PCI intervention ( $p < 0.001$ ). As regards the regional longitudinal strain (RLS), the mean RLS in CTO area improved from  $-13.82 \pm -4.34$  early to  $-15.31 \pm -4.64$  post PCI intervention ( $p = 0.043$ ) and also mean RLS non-CTO area improved ( $p = 0.011$ ). While, the mean donor RLS which denoted the source of collateral blood flow to CTO area not improved post PCI intervention. There were 5 patients developed contrast induced nephropathy (CIN), there were 3 patient died following CTO-PCI and there were 13 patients developed other MACE (major adverse cardiovascular events) within 3-months follow-up period.

**Table 1:** Standard echocardiographic parameters in post-PCI-CTO and 3-months follow-up period

Trans-Thoracic Echocardiography	Post-PCI Mean±SD.	3months Follow- up Mean±SD.	p- value
EDV(ml)	97.43±20.48	95.83±26.40	0.109
ESV (ml)	45.20±12.60	40.83±16.22	<0.001*
EF(%)	53.91±7.58	57.81±7.82	<0.001*
LAVi	30.24±4.88	30.26±3.58	0.469
E/e'ratio	10.84±3.03	9.31± 2.67	<0.001*

**Table 2:** Speckle tracking echocardiography with global and longitudinal strain in post-PCI-CTO and 3-months follow-up period

	Post-PCI Mean ± SD.	3monthsFollow- up Mean±SD.	p
GLS average	$-13.38 \pm -4.12$	$-15.94 \pm -3.92$	<0.001*
RLS in CTO area	$-13.82 \pm -4.34$	$-15.31 \pm -4.64$	0.043*
RLS in Donor area	$-14.82 \pm -3.77$	$-14.61 \pm -4.16$	0.724
RLS in Non-CTO area	$-15.28 \pm -5.19$	$-17.29 \pm -5.20$	0.011*

**Table 3:** Prognostic performance for increase in GLS to predict improvement in ESV

	AUC	p	95% C.I	Cut off	Sensitivity	Specificity	PPV	NPV
Increase in GLS	0.854	0.006*	0.729 – 0.979	>0.9#	82.93	83.33	97.1	41.7

**Table 4:** Prognostic performance for increase in GLS to predict improvement in EF.

	AUC	p	95% C.I	Cut off	Sensitivity	Specificity	PPV	NPV
Increase in GLS	0.739	0.045*	0.515 – 0.993	>0.7#	85.0	71.43	94.4	45.5

## Conclusion

We conclude that successful PCI for CTO, with evidence of a viable myocardium leads to an improvement in left ventricular (LV) function, global longitudinal strain (GLS) and regional longitudinal strain (RLS) as assessed by speckle tracking echocardiography. GLS was found to be a sensitive predictor of LV reverse remodeling during the 3-month follow-up period post PCI-CTO.