



האיגוד הישראלי לכירורגית לב וחזה
THE ISRAEL SOCIETY OF CARDIOTHORACIC SURGERY

האיגוד הקרדיולוגי בישראל
ISRAEL HEART SOCIETY



The 60th International Conference of the Israel Heart Society
in association with the Israel Society of Cardiothoracic Surgery

22-23 April 2013, ICC International Convention Center, Jerusalem

Echocardiographic Index of Myocardial Stunning Predicts Recovery of Left Ventricular Systolic Function after Primary Coronary Angioplasty

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Disclosure of interests: None.



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Introduction I

- The annual incidence of acute MI in USA is 865000, 565000 of them new
- PPCI is the treatment of choice in acute STEMI
- Coronary flow is important in determining LV functional recovery and prognosis
- TIMI flow grade is used to assess coronary flow, and myocardial blush grade for myocardial perfusion



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Introduction II

- Primary coronary angioplasty (PPCI) may save myocardium at risk in the setting of acute ST elevation myocardial infarction (STEMI).
- Myocardium that recovers its functions later after resumption of coronary artery patency is considered to be stunned.



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Introduction III

- Immediately after PPCI, coronary flow is high relative to contraction at regions of myocardial stunning.
- Thus, coronary flow to myocardial contraction ratio may be applicable to evaluate myocardial stunning



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Aim

Evaluation of coronary artery flow and flow/contraction stunning index in the prediction of recovery of left ventricular (LV) function after PPCI.



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Methods

Study Population

36 patients presenting with acute anterior STEMI.

16 subjects had suboptimal PPCI and impaired coronary microcirculation.

Control group

96 normal subjects



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Inclusion Criteria

Patients admitted with acute anterior STEMI, and:

- First MI
- Routine informed consent for PPCI
- PPCI within 12 hrs of symptoms
- Definition of ANT STEMI: Chest pain for more than 30min, ST elevation ≥ 2 mm in at least 2 contiguous chest leads



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Exclusion Criteria

- Old STEMI
- Failed PPCI
- Previous CABG
- Significant MLCA disease
- Suboptimal Doppler-TTE study



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Doppler Sampling of LAD Flow

TTE Doppler sampling was achieved from:

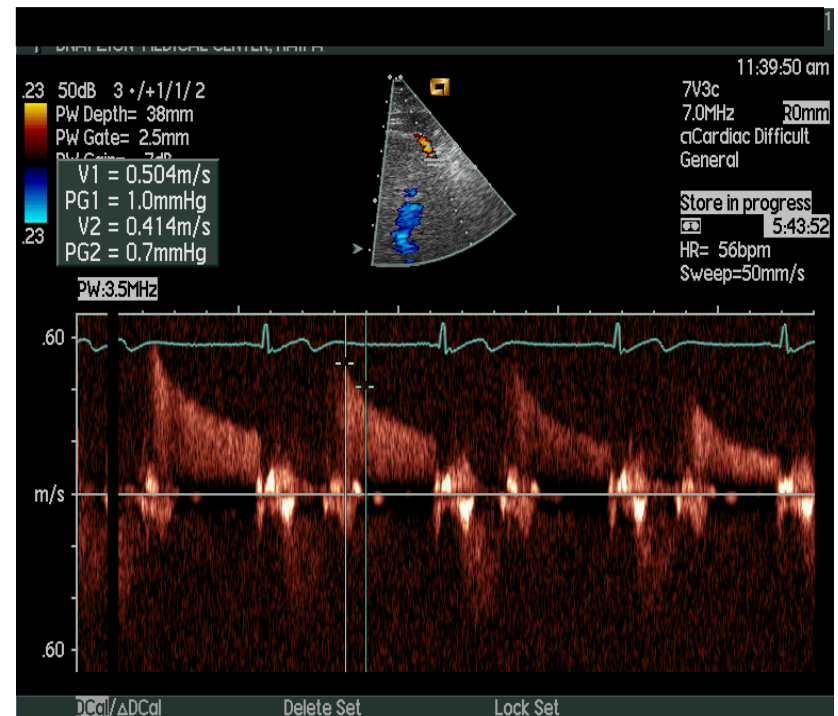
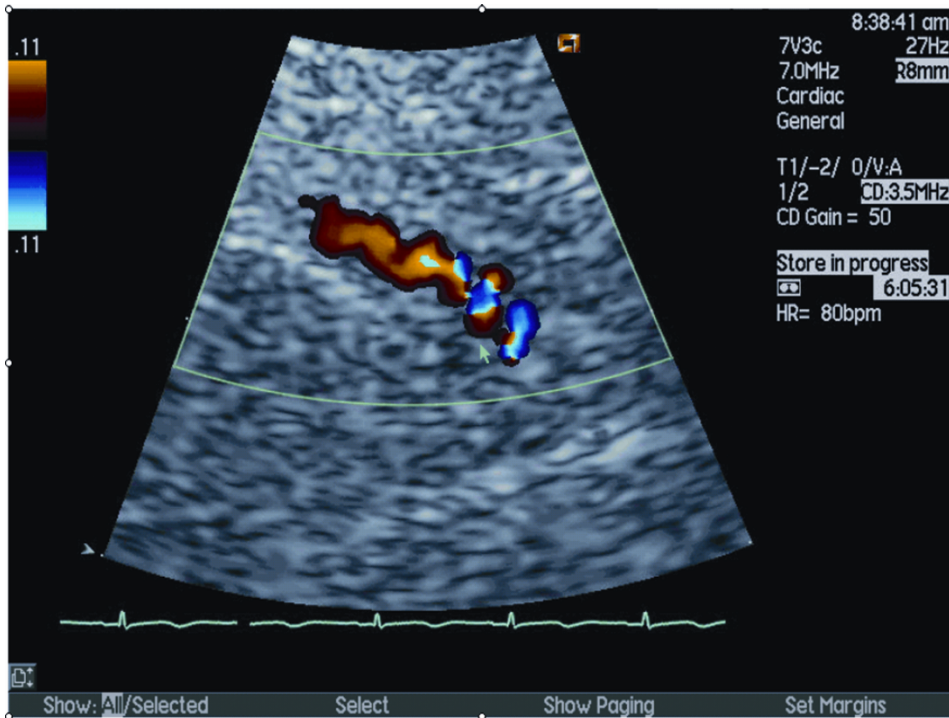
1. Para-sternal SAX view & clockwise rotation.
2. Modified apical 2-chamber chamber view & counter clockwise rotation.
3. PW guided by Color-Doppler with forward diastolic velocity in the anterior inter-ventricular groove.



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Color and PW LAD Velocity





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LAD FLOW

$$LAD \quad - \quad Flow \quad = \quad \pi \quad R^2 \quad \times \quad TVI \quad \times \quad HR$$



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Stunning index

$$\text{Flow / Contraction Index} = \frac{LAD - Flow}{LVEF \times 100}$$

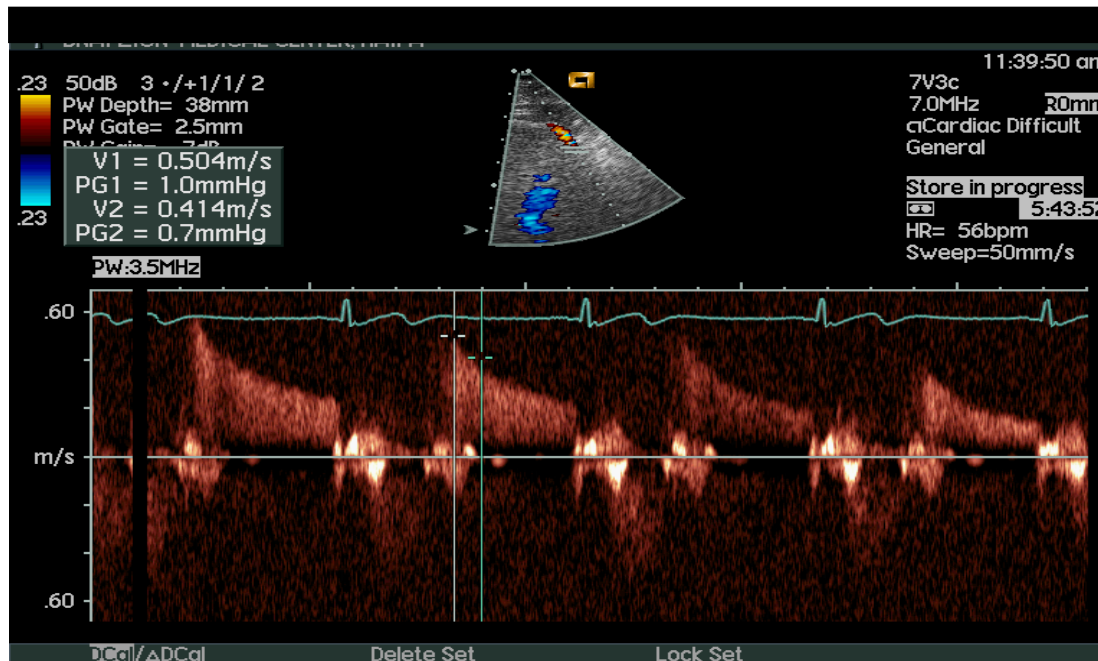


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Results

Normal subjects





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Normal subjects

EF (%)	58.9±2.96
VD (cm/sec)	33±14
TVID (cm)	9.8±3.8
TVID*HR	689.7±392
Flow (ml/min)	43±23
FLOWD/EF	0.74±0.4

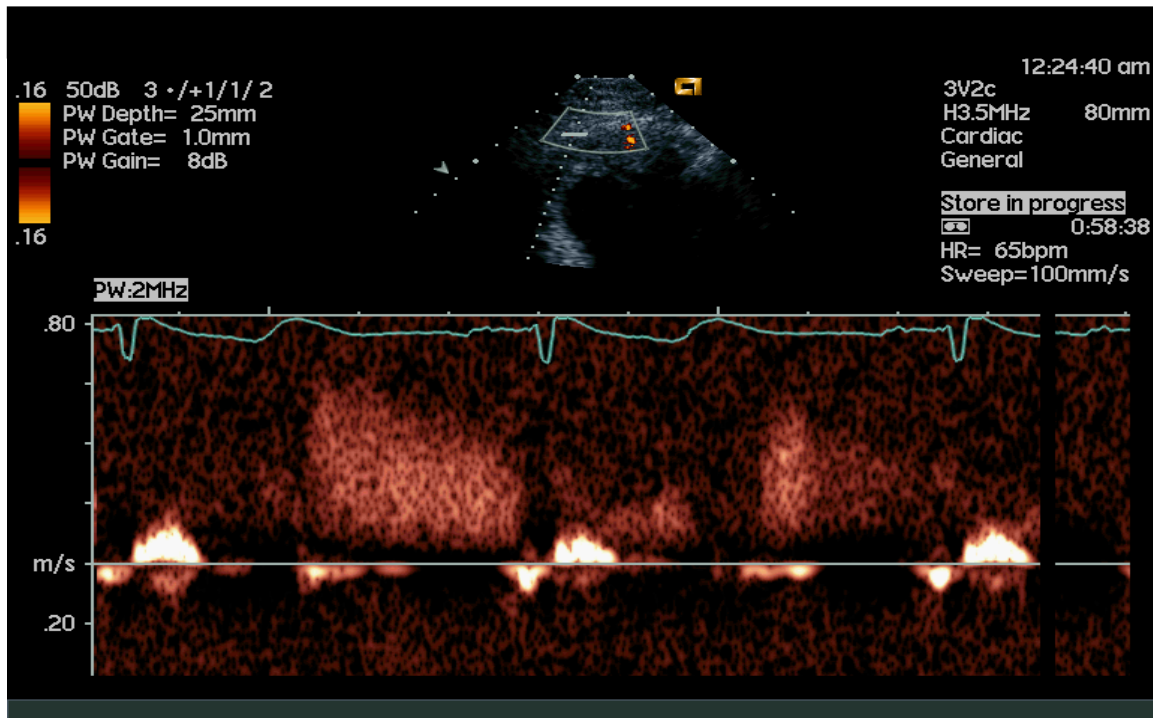


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Optimal PPCI Result

DDT > 600 msec, AMI, PPCI (n=20)





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Optimal PPCI Result

LAD Diastolic Flow Post PCI, DT > 600msec (n=20)

	Early	48hr.	Late
Flow (ml/min)	39.8±21	43.8±20.7	49.6±13.8
P -value	Early/48hr.	Early/Late	48hr/Late
	0.47	0.04	0.34



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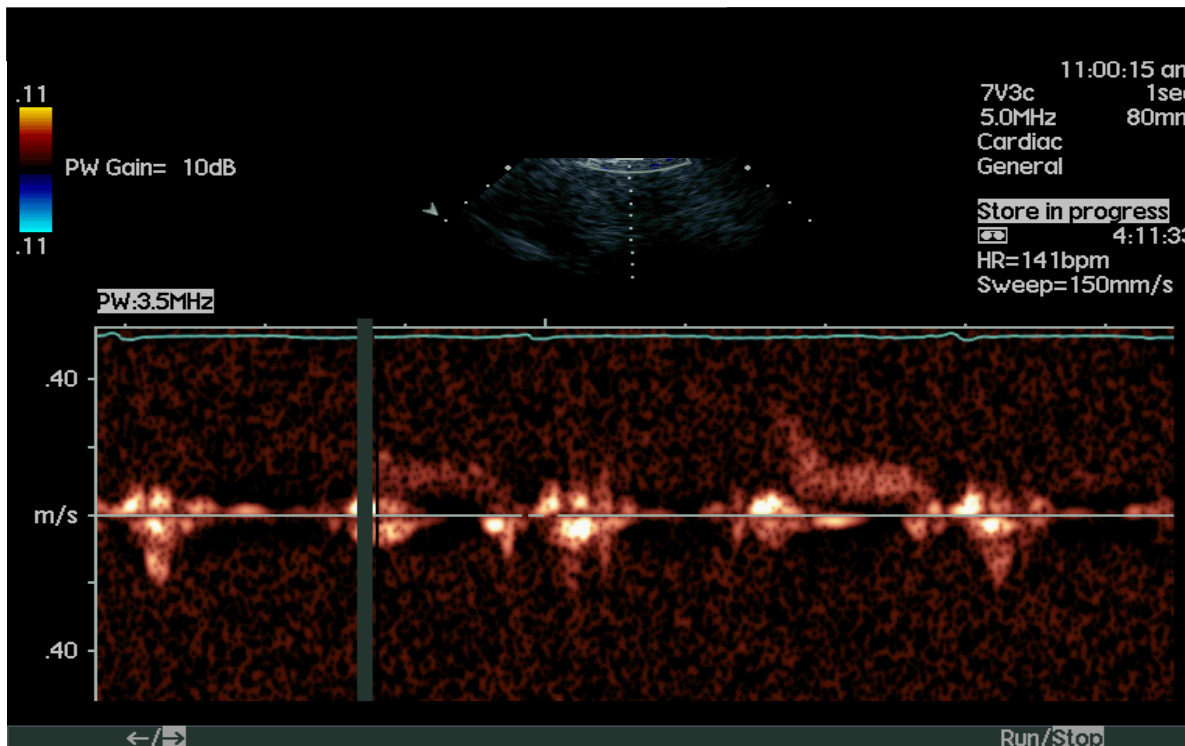


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Suboptimal PPCI Result

DDT < 600 msec, AMI, PPCI (n=16)





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Suboptimal PPCI Result

LAD Diastolic Flow Post PCI, DT < 600msec (n=16)

	Early	48hr.	Late
Flow (ml/min)	29.4±21	50.3±28.5	46.4±28.3
P -value	Early/48hr.	Early/Late	48hr/Late
	0.032	0.04	0.6



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Stunning Index and LV Function

	EF _{Early}	EF _{Late}	Flow/EF _{Early}	P-value EF _{Early} :EF _{Late}
DDT>600 (msec)	38.8 ±7.3	47.8 ±9.3	1.08 ±0.34	0.004
DDT<600 (msec)	36.4 ±7.4	39.4 ±6.4	0.82 ±0.53	0.273
Normal	58.9±2.96	58.9±2.96	0.74±0.4	ns
P-value	<0.01*	<0.05*	<0.005**	

*) both patient groups vs normal

***) optimal PPCI group vs other groups



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Conclusions

- *After PPCI coronary flow is dynamic,*
- *Higher early coronary flow in optimal PPCI with recovery of LVEF*
- *Higher early coronary y flow/contraction stunning index with recovery of LVEF*