Introduction.

Myocardial perfusion & contractility becomes abnormal immediately after the onset of ischaemia, even before the development of the symptoms & ST segment changes.
Ischaemic Heart Disease

Myocardial Wall Motion

Chest pain syndrome

Myocardial infarction
Wall motion analysis

Regional Analysis

Global Analysis

Regional WM
Wall motion analysis

I. Regional

Quantitative method
Semiquantitative
Qualitative method

Regional / Qualitative

Segmental Wall motion abnormalities analysis
**Introduction**

Myocardial wall thickness increase > 40% During systole.  
If myocardial thickening during systole
  ↑ by  < 30%  Hypokinesia
  < 10 %  Akinesia
Outward motion of the myocardium during systole  Dyskinesia

**Introduction**

ASE divided the LV into **16 segments**

Each segment is assigned a score based on its contractility :

- Normal = 1
- Hypokinesia = 2
- Akinesia = 3
- Dyskinesia = 4
- Aneurysm/ scar 5
Wall motion analysis

I. Regional

Quantitative methods

Semiquantitative

Qualitative methods

Wall motion analysis

Regional / Semiquantitative

Segmental Wall Scor Index

SWMI
Wall motion score index WMSI

On the basis of wall motion analysis scheme, WMSI is calculated to semiquantitate the extent of RWMA.  

\[
\text{WMSI} = \frac{\text{Sum of WM scores}}{\text{Number of segment visualized}} = 16
\]

i.e. Normally \( 16/16 = 1 \)

The larger the infarction, the higher the WMSI, as WMA become more severe. This correlation is better in AMI than inferior or lateral type.
Wall motion analysis

I. Regional

Quantitative methods

Semiquantitative

Qualitative methods

Regional / Quantitative

LVEF

TDI: strain & strain rate
  Wall velocity
  Myocardial displacement
  Myocardial gradient
Wall motion analysis

Regional

Global

II. Global

LV volumes & LVEF

Annular displacement (TDI)

Ventricular geometry

Short – axis area changes
Myocardial Wall Motion

Chest pain syndrome

Myocardial infarction
Chest pain syndrome

ECG

Laboratory, Enzyme

Echocardiography.

Chest pain syndrome

50% of patients with myocardial infarction have non-specific ECG changes on the initial tracing.
Role of Echo in CP syndrome

Myocardial at risk .... RWMA
LV function .......... EF
Differential diagnosis

Myocardial at risk CP syndrome

Detect the amount of myocardium at risk from the affected artery that determine which patient will get benefit from the interventional therapy, WMSI

The larger myocardium at risk the more benefit is expected.
LV function CP syndrome

Evaluate the LV function, the Ejection fraction which is power prognostic value in patient with post MI

Diff. diag. CP syndrome

Echocardiography detect fatal cause of chest pain syndrome in which thrombolytic therapy may have disastrous clinical outcome:

Aortic Dissection
Pericardial effusion
Pulmonary embolism
Ischaemic Heart Disease

Myocardial Wall Motion

Chest pain syndrome

Myocardial infarction
Role of echo in MI

Detection of infarct complication

Risk stratification

Evaluation of myocardial viability

Infarct complication

Acute phase

Chronic phase
Role of echo in MI

**Acute stage:** LV systolic dysfunction
  - Myocardial rupture (VSD, PM)
  - MR (LVD, PMD)
  - LV thrombi
  - PE
  - RV involvement
Role of echo in MI

**Chronic stage:**

- *Infarct expansion*
- *LV aneurysm (true, false)*
- *LV thrombi*
Role of echo in MI

Detection of infarct complication

Risk stratification

Evaluation of myocardial viability
Risk stratification

High risk of future cardiac events after AMI

- Systolic dysfunction < 40%
- Extensive MI WMSI > 1.7
- Diastolic dysfunction (restrictive)

Risk stratification

High risk of future cardiac events after AMI

- LV enlargement
- LA enlargement
- MR, ERO> 2 mm²
- Stress test........ positive
Role of echo in MI

Detection of infarct complication

Risk stratification

Evaluation of myocardial viability
When 20% or more of the transmural thickness is involved by ischaemia or infarct **Akinesia** of the WM segment.

Substantial amount of myocardium may still be viable (even when no mechanical contractility is visualized)

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**Assessment of viability**

- Rest
- Stress Echo
Myocardial viability (rest):

wall thickness > 6 mm

No evidence of fibrosis
Myocardial viability (stress):

Low dose of DOB: improves myocardial contractility

Types of Stress

Exercise
Pharmacologic
Pacing
Conclusion

Important role in ACPS

Estimation of myocardial at risk (final infarct size) by RWMI

Evaluation of LV function
Detect, assess the complication in MI

Powerful risk stratification method in MI

Method of choice in assessing myocardial viability in MI

Thank you