

Element 15.00

Schnittger

Assessing Systolic Failure

EF of 45%

- Patient with 4+ MR
- Patient with CAD
- MR ↑ preload and ↓ afterload and a “supernormal” EF

Assessing Systolic Failure

Complex process

- **Volume**
- **Mass**
- **Geometry**
- **Contractile (systolic) function**

Assessing LV Volume

LV-ESV

- Major predictor of survival after acute MI if LVEF < 50%
- Correlates with outcome after valve surgery for AR and MR

Measurement of LV Volume

- Limitations: EBD, geometric assumptions & reproducibility
- Harmonic imaging, automatic border detection & contrast may help
- 3D more accurate, M-mode LV size more simple

Assessing LV mass

Compensating pressure/volume overload

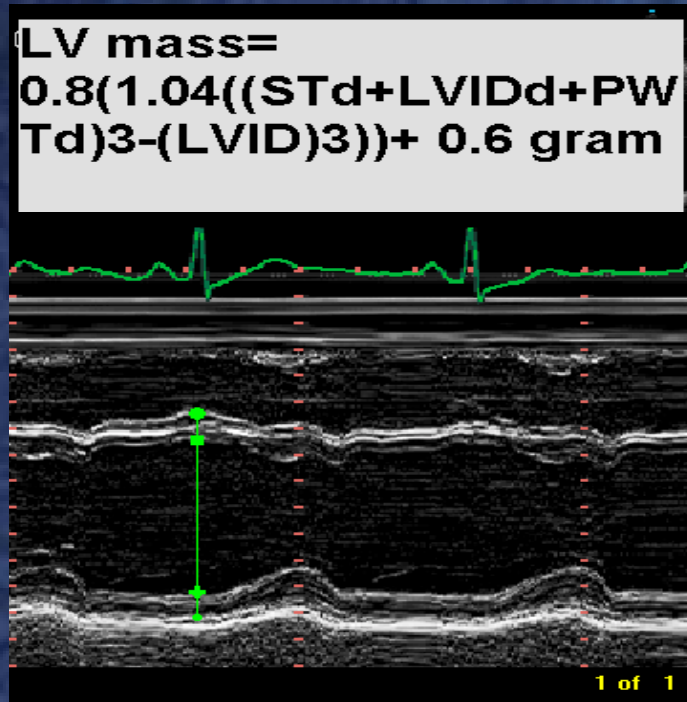
- **AS: *increased mass* → *decrease in stress/ unit myocardium***
- **Dilated CM: *M/V ratio >0.9 has better outcome***

Measurement of LV mass

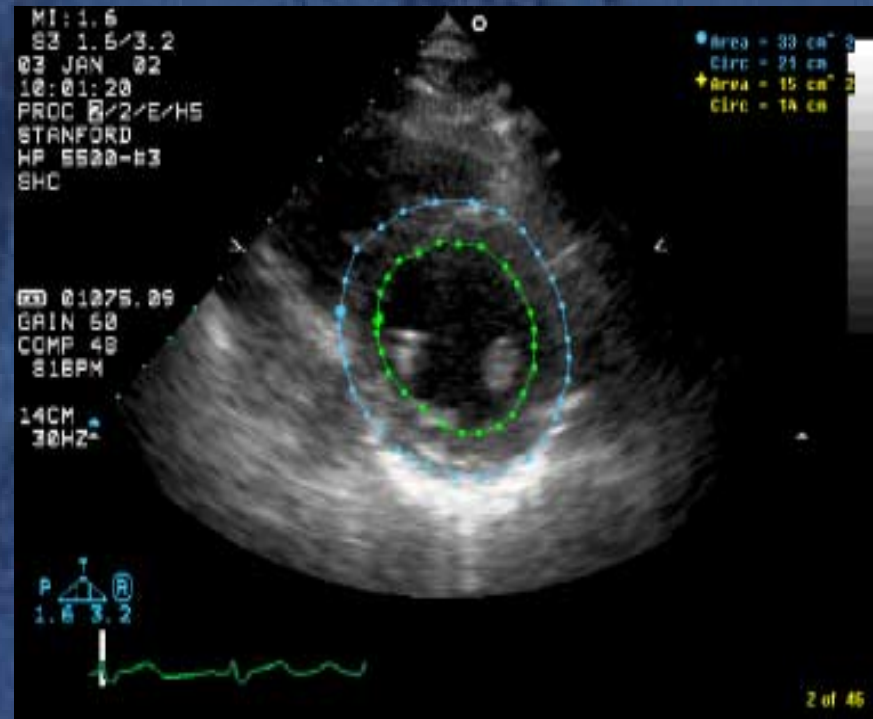
- M-mode echo
the cube formula
- 2D and 3D mass
more accurate
- Simplified measure
LV wall thickness

Measurements of LV mass

- M-mode Cube formula



- 2D tracing of endo/epicardium

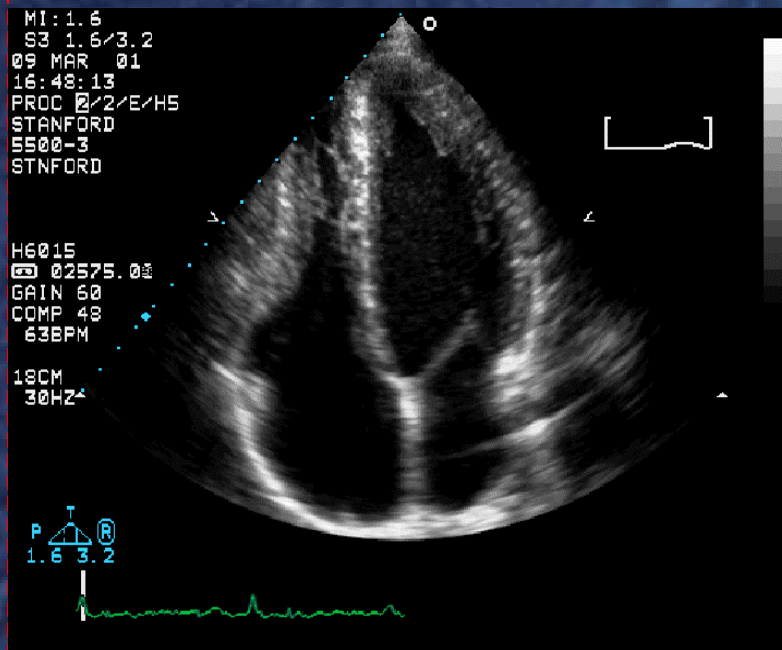


MOVIES

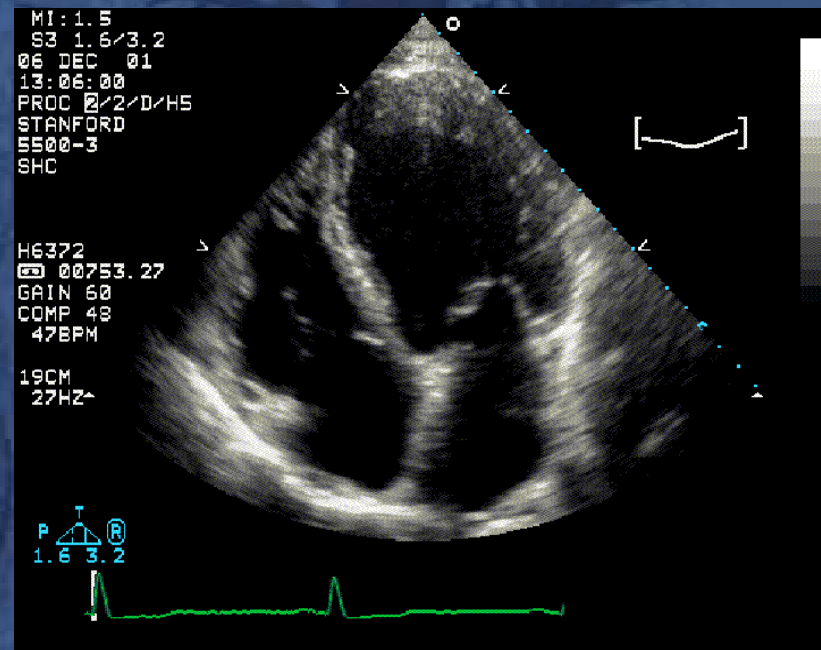
Assessing LV Geometry *Overall pump performance*

Consider the impact of ACE inhibitors

■ Ellipsoid LV



■ Spherical LV



Measurement of LV geometry

- Qualitative
- Quantative parameters include:
 - short axis/long axis ratio*
 - volume/mass ratio*
 - relative wall thickness*

Assessing Contractile Function

- Inotropic state (“contractility”)
 - preload (ED wall stress)*
 - afterload (ES wall stress)*
- True measure
 - Slope of ES pressure-volume relation*

Measurements of Systolic Function

- In clinical practice
 - Measurements of EF*
- Other measurements
 - FS by M-mode*
 - Velocity of circumferential fiber shortening (Vcf)*
 - Doppler TVI of Ao OT*

Assessment of Regional Systolic Function

- Wall motion
- Wall thickening
- Doppler tissue imaging
e.g. M-mode color DTI
- Viability

Measurements of Regional Systolic Function

- **Wall motion (thickening):**
 - qualitatively: score*
 - quantitatively: endo/epi borders*
- **Viability**
 - assessed pharmacologically*