M-Mode Echocardiography
Is it still Alive?

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Honoraria: Philips
Classical M-mode Echocardiography
M-Mode offers better time and image resolution.

**Sampling Rate**
- M-Mode: 1800 / sec
- 2D: 30 / sec

**Disadvantages**
1. Single Dimension (depth only)
2. Nonperpendicular orientation (always use 2D guidance).
M-Mode of RA & LA Myxomas

Back cover of ECHOCARDIOGRAPHY
Feigenbaum, 3rd edition
MV Prolapse
M-Mode in HOCM

ASH / SAM

Mid-systolic AV Closure
Markers of LV Dysfunction

A-C Shoulder ("B-Bump")

Feigenbaum, ECHOCARDIOGRAPHY
What does the m-mode show?

1. MS
2. AI
3. Flail MV
4. Myxoma
Answer: 3. Posterior Leaflet Motion in Flail MV

Note that the posterior leaflet moves anteriorly in early diastole, before it moves posteriorly.
ASD with Large L to R Shunt

Note markedly dilated RV and “paradoxical” septal motion
Dyssynchrony of >130msec is associated with good CRT response
(sensitivity 100%, specificity 63%)
This M mode finding is not associated with increased risk of:

A. Coarctation
B. Pulmonic Stenosis
C. Subaortic Stenosis
D. Aortic insufficiency
Echo of pt with Endocarditis and Shock

Best Rx is:

1. AVR
2. MVR
3. IABP
4. Can not tell
Echo of pt with Endocarditis and Shock

Answer:

1. AVR
Note premature closure of MV & echogenic mass in LVOT (Ao veg. Vs. flail Ao cusp)
Differential Dx of Premature MV Closure

A. AR
B. First Degree AV Block
C. High Degree AV Block
D. Blocked APC
E. Atrial Flutter
The most likely physical finding in this pt is

1. Absent left subclavian pulse
2. High pulse pressure
3. Loud fourth heart sound
4. Apical systolic thrill
Severe Aortic Regurgitation
A patient with this finding will have, most likely, this murmur:

A) Apical Holosystolic
B) Apical Diastolic Rumble
C) Low pitch mid-diastolic at the Rt Base
D) Systolic ejection increased with Valsalva at LSB
The Correct answer is B: Apical Diastolic Rumble

(Austin Flint Murmur)

While fine MV Flutter is indeed a marker of AI
Mid-Diastolic low pitch murmur at the Base is not
Fine MV Fluttering in AR

Commonly seen with AR, but not a marker of severity.
37 y.o. woman with dyspnea and systolic murmur.

Diagnosis?:
A. Valvular PS
B. Pulmonary Htn
C. Constrictive pericarditis
D. Can not tell
ANSWER:

B. Pulmonary Htn

Note the absence of A-dip in spite of NSR

and also the “flying W” pattern
Pulmonic Valve M-Mode

Normal PV

Feigenbaum, Echocardiography, 3rd ed.
Pulmonic Valve M-Mode in PS
M-Mode in Cardiac Tamponade

Diastolic RV Collapse
M-Mode in Cardiac Tamponade

Inspiratory Decrease in LV Dimension ("Pulsus Paradoxus")

Note inspiratory decrease in MV excursion
Respiratory Variation in Ventricular Sizes
Pulsus Paradoxus
Cardiac Tamponade
M-Mode in Pulsus Paradoxicus

Marked respiratory variation in aortic valve opening
RV diastolic collapse
M-Mode in Constrictive Pericarditis

Note the thickened pericardium and the lack of late diastolic LV expansion.
M-Mode in Constrictive Pericarditis

Note the diastolic Septal “bounce”
Normally acceleration and deceleration are sharp
And rapid. Note blunting of valve excursion on the right.
47 y.o. female with palpitations, Dx?

A. ASD (secundum)
B. Ebstein’s
C. Intra-aortic Balloon
D. Arrhythmogenic RV Dysplasia
MV in Atrial Flutter with variable block
M-Mode in Arrhythmia

Effect of rapid VR on LV Function
M-Mode in WPW Type A

Note pre-excitation of the posterior wall
What is the Dx?

A. AV Diss’n
B. Atrial Diss’n
C. AV Block
D. Artifact
Assessing Hemodynamics

RA pressure (using IVC size)
IVC plethora

Estimated IVC pressure 20mmHg
M-mode Color Doppler
Transesophageal Echo

MR
Mitral Regurgitation

Tips and Tricks
M-mode Color Doppler of LV Filling

Normal Slope $\geq 45$ cm/sec

Garcia 1996
Tricuspid Annular Plane Systolic Excursion (TAPSE)
Mitral Annular Plane Systolic Excursion (MAPSE)

Markers of global ventricular systolic function
M-Mode Contrast Echo (IV Saline Injection)

Tajik & Seward, 1979

What is the Dx?

A. VSD, R to L shunt
B. VSD, L to R shunt
C. ASD, L to R shunt
D. ASD, R to L shunt

Injection to rt hand vein
M-Mode Contrast Echo (IV Saline Injection)

Tajik & Seward, 1977

VSD with R to L shunt

Note that after contrast appears in the RV, it is seen in the LV, sparing the MV orifice.
What is the most likely presentation of this pt:
A- Round mass in left lung known for 20 years
B - New LBBB
C - CABG 7 years ago
D - Loud holosystolic murmur along the LSB
10 reasons to use M-mode Echocardiography

1. Better understanding of LA hemodynamics
2. Better estimation of time intervals
3. Simple evaluation of dyssynchrony
4. Motion patterns of normal and abnormal structures
5. Identify high frequency motion
6. Evaluation of PHT even in the absence of TR/PR
7. Insight into mechanism of paradoxical pulse and tamponade
8. Better evaluation of prosthetic valve function
9. Diagnose Arrhythmias (sometimes better than EKG…)
10. Color M-mode for timing and flow propagation