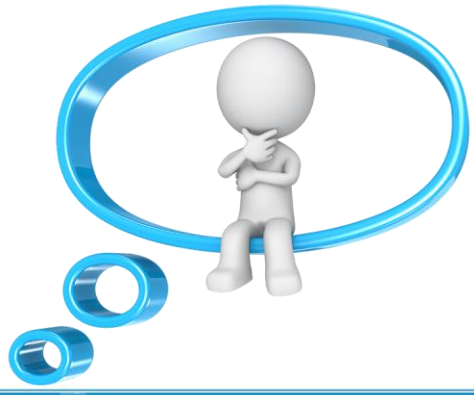

Think Quick!

Make the Diagnosis with Just One Clip

Bonita Anderson

DMU (Cardiac), MApplSc (Med Ultrasound), ACS, AMS, FASE

Disclosures

- None

Clip #1

Descending aorta PW Doppler

This profile is consistent with:

1. Severe aortic regurgitation
2. Patent ductus arteriosus
3. Ruptured SOV aneurysm
4. Any of the above

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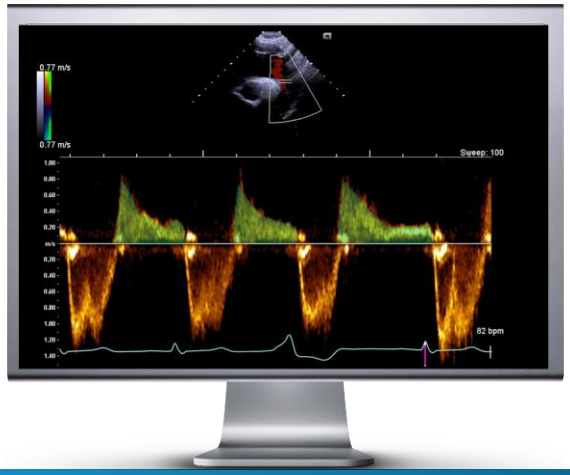
Pan-diastolic Flow Reversal in Aorta

Sample volume placed 1 cm distal to origin of Lt Subclav A



- Most often associated with severe AR
- Can occur when there is a communication between the higher pressure aorta & a lower pressure chamber/vessel/channel

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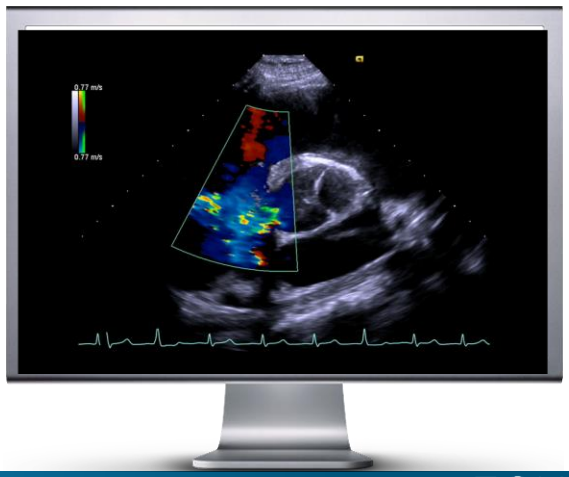
Ruptured Sinus of Valsalva Aneurysm

SVA are uncommon; often congenital, may be acquired



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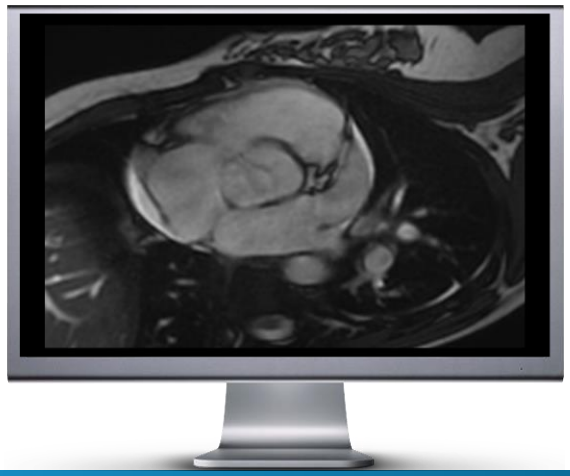
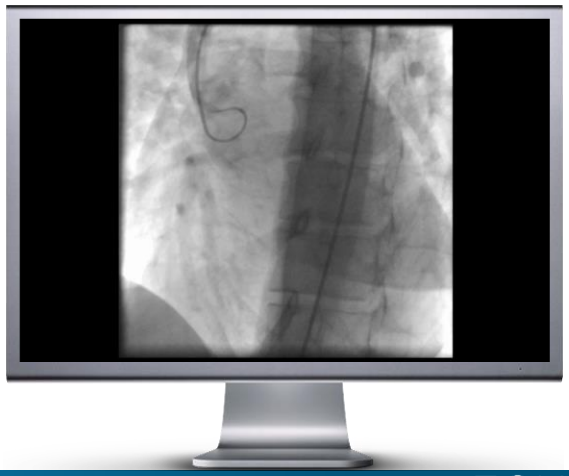
Ruptured Sinus of Valsalva Aneurysm

CMR



Aortogram



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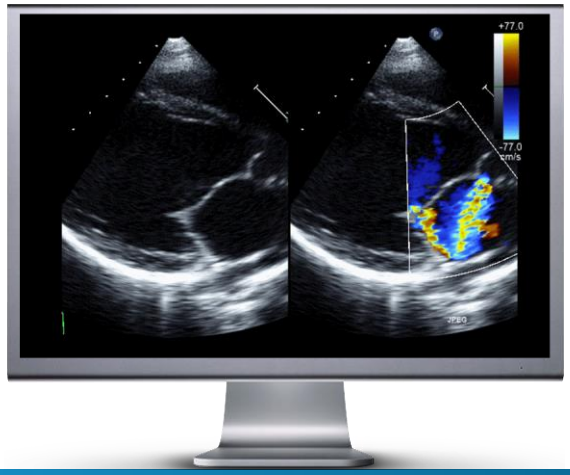
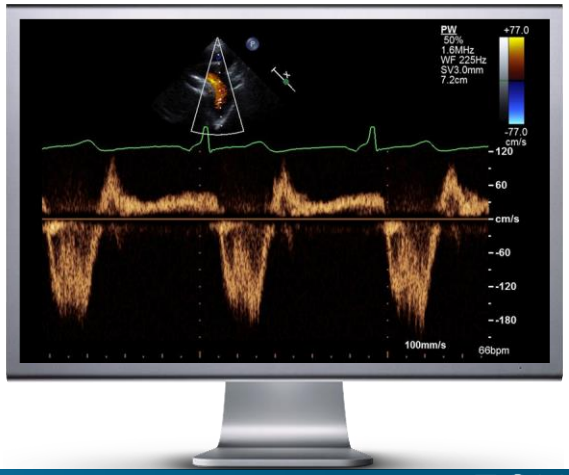
Aorta-to-LA Fistula

PLAX



Descending Aorta PWD



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Clip #2

38 yo male with Ebstein's anomaly & severe TR. Routine progress echo

What is the likely diagnosis?

A. Atrial myxoma

B. Blood cyst

C. Papillary fibroelastoma

D. Valve aneurysm

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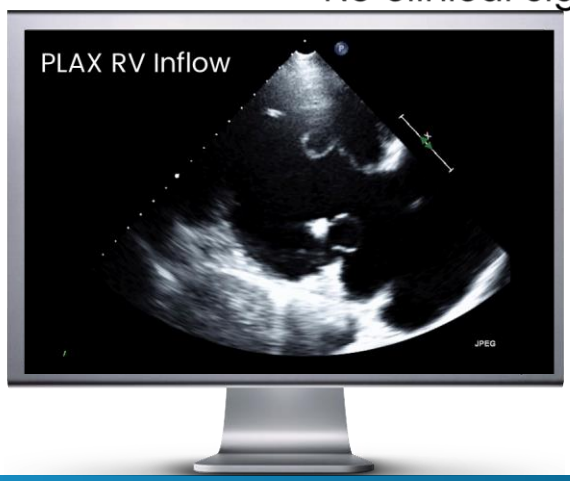
Most likely a Blood Cyst

Echolucent, circular structure attached to atrial side of TV
No clinical signs of endocarditis



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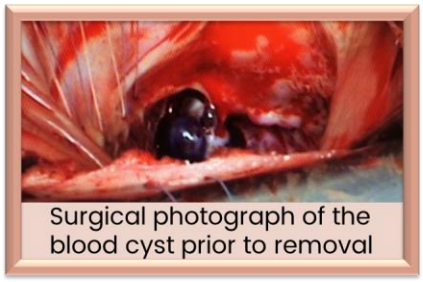
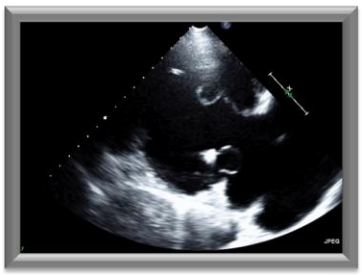
Blood Cysts


Surgical photograph of the blood cyst prior to removal

- Benign, congenital endothelial cysts containing venous blood
- May arise from LA, RA, LV, RV or any cardiac valve



- On echo: appear as an echolucent, spherical structure surrounded by a thin wall membrane

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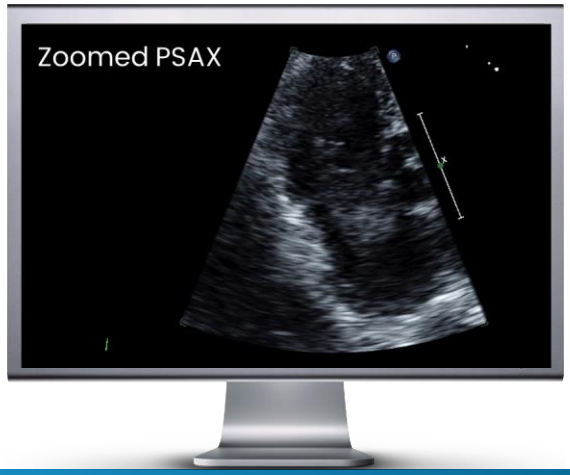
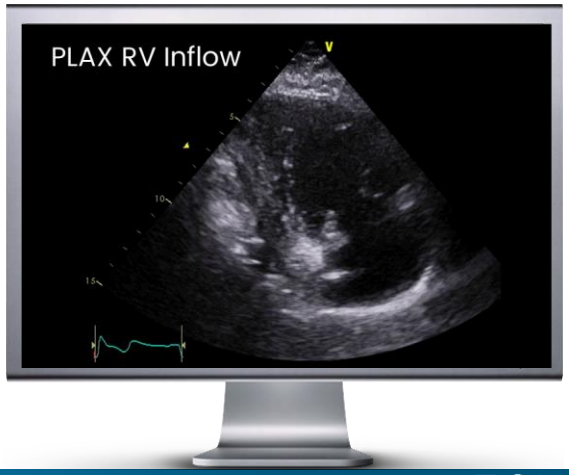
Differentiated from.....

RA Myxoma



Papillary Fibroelastoma



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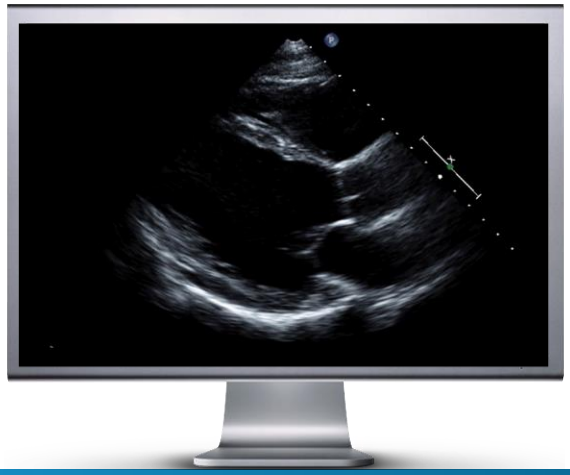
Clip #3

48 yo male with a 'systemic disease' & PPM for CHB



What is the systemic disease?

1. Cardiac sarcoidosis
2. Fabry disease (late stage)
3. Scleroderma
4. Systemic lupus erythematous

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Systemic Disease	Description	Echo features
Systemic lupus erythematous (SLE)	Chronic multisystem, autoimmune disorder (recurrent inflammatory disease)	• Pericarditis (most common) • Libman-Sacks endocarditis • RWMA (2^0 to CAD, MI) • PHTN
Fabry disease	X-linked recessive, lysosomal storage disorder	• Concentric LVH +/- RVH • RWMA (2^0 to CAD, MI)
Cardiac sarcoidosis	Infiltrative, granulomatous disease of unknown aetiology	• RWMA (non-coronary distribution) • Thinning of basal anterior IVS • PHTN (pulmonary involvement)
Scleroderma	Autoimmune disease with excessive connective tissue accumulation	• Pericardial effusion (most common) • RWMA (2^0 to CAD, MI) • PHTN

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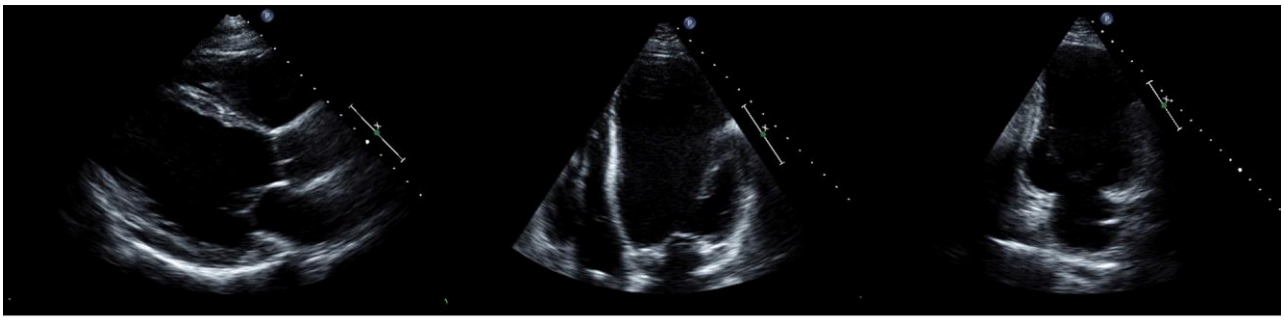
Clues to Cardiac Sarcoidosis

Basal IVS thinning (or thickening) LV dilatation & reduced LVEF Aneurysm



RWMA in non-coronary distribution regions

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Table 1. Guidelines for Diagnosis of CS (2006)

Histologic diagnosis group

Cardiac sarcoidosis is confirmed when endomyocardial biopsy specimens demonstrate noncaseating epithelioid cell granulomas with histological or clinical diagnosis of extracardiac sarcoidosis.

Clinical diagnosis group

Although endomyocardial biopsy specimens do not demonstrate noncaseating epithelioid cell granulomas, extracardiac sarcoidosis is diagnosed histologically or clinically and satisfies the following conditions and more than 1 in 6 basic diagnostic criteria.

1. 2 or more of the 4 major criteria are satisfied.
2. 1 in 4 of the major criteria and 2 or more of the 5 minor criteria are satisfied.

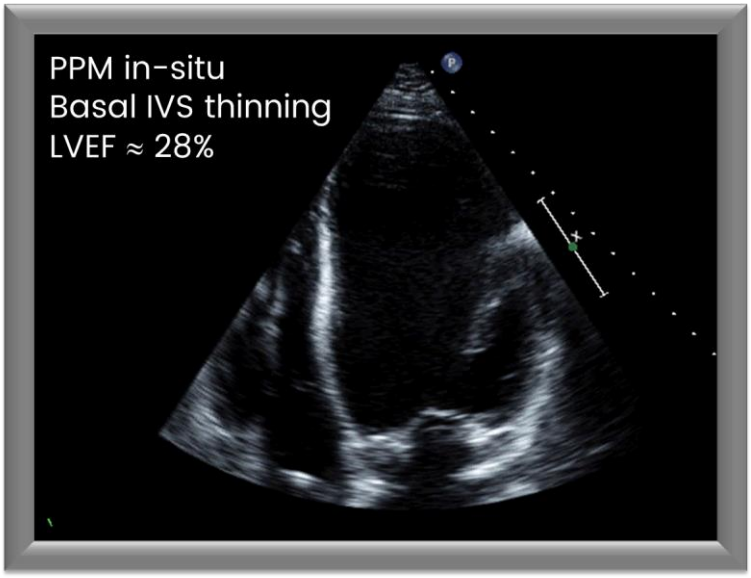
Major criteria

a. Advanced atrioventricular block.
b. Basal thinning of the interventricular septum.
c. Positive ^{67}gallium uptake in the heart.
d. Depressed ejection fraction of the left ventricle (<50%).

Minor criteria

a. Abnormal ECG findings: ventricular arrhythmias (ventricular tachycardia, multifocal or frequent PVCs), CRBBB, axis deviation or abnormal Q-wave.
b. Abnormal echocardiography: regional abnormal wall motion or morphological abnormality (ventricular aneurysm, wall thickening).
c. Nuclear medicine: perfusion defect detected by ^{201}thallium or ^{99m}technetium myocardial scintigraphy.
d. Gadolinium-enhanced CMR imaging: delayed enhancement of myocardium.
f. Endomyocardial biopsy: interstitial fibrosis or monocyte infiltration over moderate grade.

CMR = cardiac magnetic resonance; CRBBB = complete right bundle branch block; CS = cardiac sarcoidosis; ECG = electrocardiogram; PVC = premature ventricular contraction.



Revised Guidelines for Diagnosing Cardiac Sarcoidosis 2006 (Japanese Society of Sarcoidosis and Other Granulomatous Disorders); from J Am Coll Cardiol Img 2010;3:1219 –28

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Clip #4

33 yo male with chest pain

This image shows a/an:

1. Aberrant coronary sinus
2. Anomalous coronary artery
3. Complex subaortic membrane
4. Suboartic membrane with mirror artifact

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Congenital Heart Disease

Coronary Artery Anomalies

A Review of More than 10,000 Patients from The Clayton Cardiovascular Laboratories

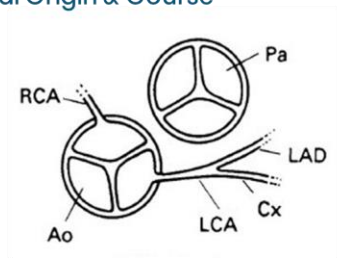
Charles E. Wilkins, MD
Benjamin Betancourt, MD
Virendra S. Mathur, MD
Ali Massumi, MD
Carlos M. De Castro, MD
Efrain Garcia, MD
Robert J. Hall, MD

We reviewed the records of 10,661 patients who had undergone coronary angiography at the Clayton Foundation Cardiovascular Laboratories between 1 June 1974 and 15 March 1986, and identified major coronary artery anomalies in 83 adults. In addition, we included in our review 9 adults and 2 adolescents who had been referred for evaluation of anomalies documented elsewhere. Here we present the clinical and angiographic data for all 94 patients (76 men and 18 women). Most patients were men who presented with chest pain. The most common anomaly, found in 38 patients, was origin of left circumflex coronary artery from right coronary artery or right aortic sinus. In contrast to other studies, which have not shown increased incidence of coronary atherosclerosis in the anomalous circumflex artery, 71% of our patients with this anomaly had significant coronary atherosclerosis in the proximal portion of the anomalous vessel. The posterior course of the anomalous circumflex coronary artery may predispose this vessel to atherosclerosis in patients with coronary disease. The overall incidence of atherosclerotic disease in coronary arteries was 68% (64 of 94 patients) in the present study. ***(Texas Heart Institute Journal 1988;15:166-173)***

Texas Heart Institute Journal 1988;15:166-173

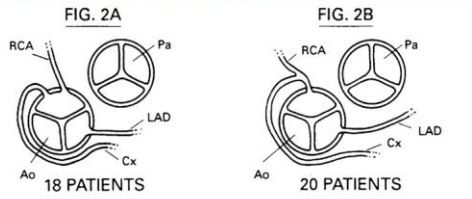
Anomalous origin of the Cx from the RCA or the right sinus of Valsalva is the most common coronary anomaly reported in angiographic series and necropsy studies.[9,20] It was found in 0.48% of our patients. This anomaly is thought to be of little clinical significance unless valve surgery or coronary artery bypass surgery is performed without previous detection of the anomaly, or unless severe atherosclerotic narrowing is present in the RCA proximal to the origin of the Cx.[20-22] In our patients, this anomaly was

Normal Origin & Course



Adapted for echo orientation

Anomalous Circumflex



Adapted for echo orientation

Fig. 2 *Diagrams showing* ***A****) origin and course of anomalous circumflex artery arising from right aortic sinus and* ***B****) from right coronary artery.*

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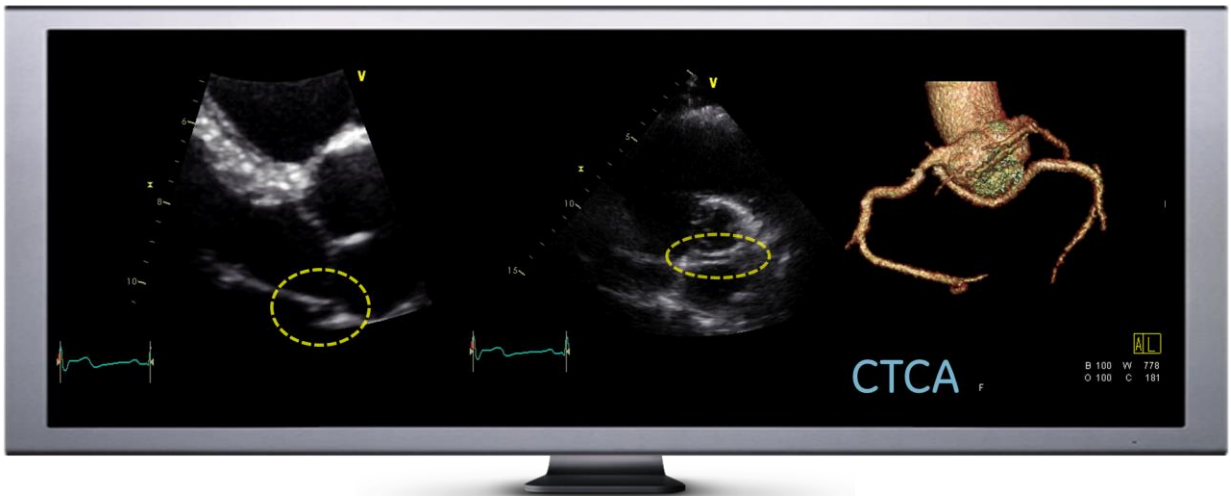
Anomalous circumflex coronary artery from right coronary sinus



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Clip #5

67 yo male with NSTEMI, T2DM

What does this show?

1. Mitral valve prolapse
2. Systolic anterior motion (LVOT obstruction)
3. Evidence of LV diastolic dysfunction
4. Evidence of LV systolic dysfunction

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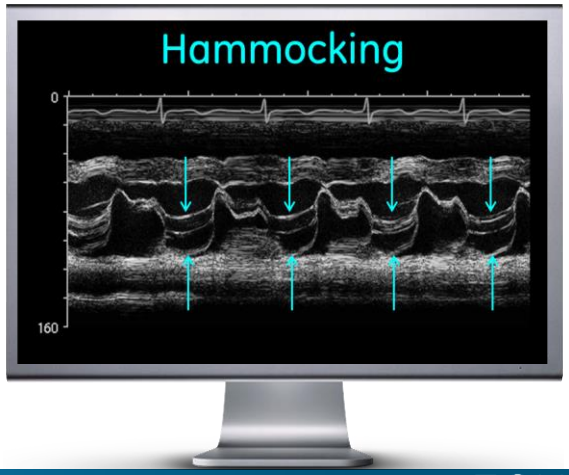
Our trace example
Not MVP

MV M-mode example of MVP



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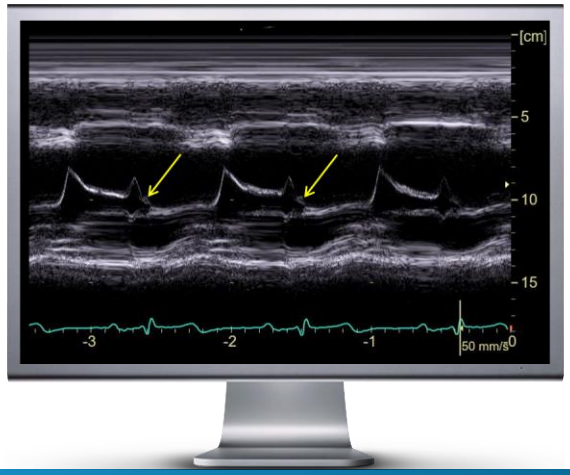
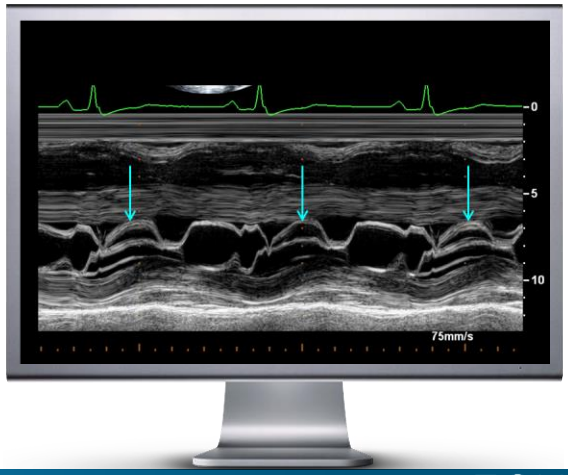
Our trace example
Not SAM



Example SAM of MV
(LVOT Obstruction)



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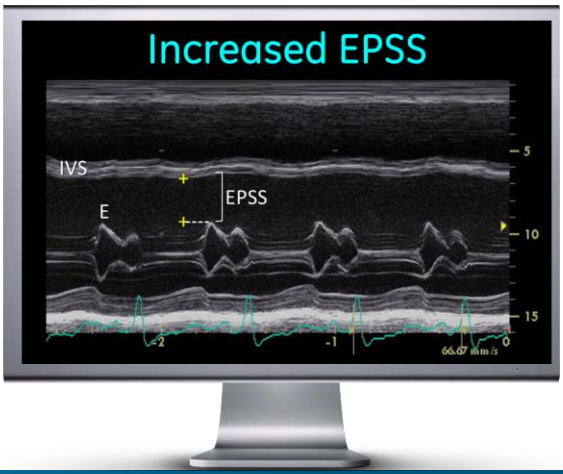
Our trace example
Not LV systolic dysfunction

Example of MV M-mode of
LV systolic dysfunction



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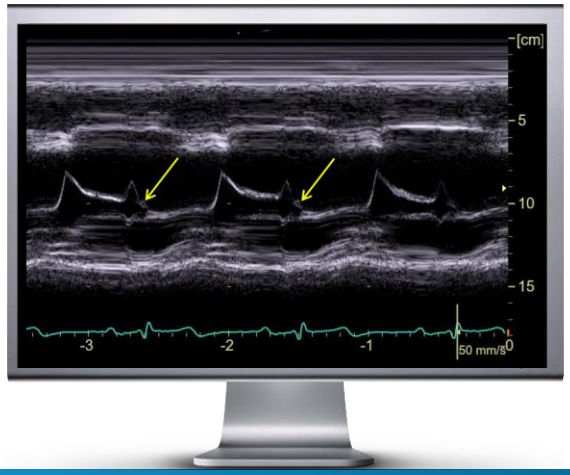
Mitral B-Bump (B-notch)

Consistent with an LVEDP > 20 mmHg



Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association.
Learn and Live.

Abnormal Mitral Valve Motion in Patients with Elevated Left Ventricular Diastolic Pressures

LEE L. KONECKE, HARVEY FEIGENBAUM, SONIA CHANG, BETTY C. CORYA and JOHN C. FISCHER

Circulation 1973, 47:989-996
doi: 10.1161/01.CIR.47.5.989

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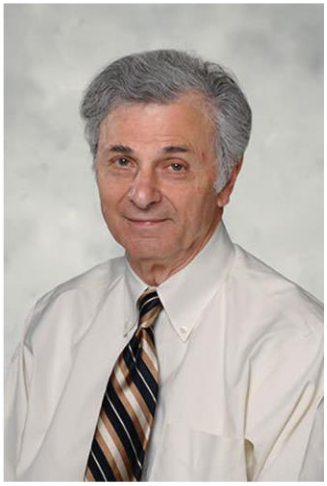
Role of M-mode Technique in Today's Echocardiography

Harvey Feigenbaum, MD, FASE, *Indianapolis, Indiana*

M-mode echocardiography is considered to be obsolete by many. The technique rarely is included in American Society of Echocardiography standards documents, except for M-mode measurements, which have limited value. The superior temporal resolution of M-mode echocardiography is frequently overlooked. Doppler recordings reflect blood velocity, whereas M-mode motion of cardiac structures reflect volumetric blood flow. The 2 examinations are hemodynamically complementary. In the current digital era, recording multiple cardiac cycles of two-dimensional echocardiographic images is no longer necessary. However, there are times when intermittent or respiratory changes occur. The M-mode technique is an effective and efficient way to record the necessary multiple cardiac cycles. In certain situations, M-mode recordings of the valves and interventricular septum can be particularly helpful in making a more accurate and complete echocardiographic cardiac assessment, thus helping to make the examination more cost-effective. (J Am Soc Echocardiogr 2010;23:240-57.)

Patients with diastolic dysfunction frequently may have elevated diastolic pressures and an M-mode B-bump, which will not be present with low LV filling pressures. This situation is another example of how M-mode and Doppler recordings can provide complementary hemodynamic information.



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Other evidence of Elevated LVEDP (this case)

Ar-A duration >30 ms and Ar velocity > 35 cm/s *

* Nishimura, R. et al. Circulation. 1990 May;81(5):1488-97 and Nagueh S, et al. J Am Soc Echocardiogr. 2009 Feb;22(2):107-33

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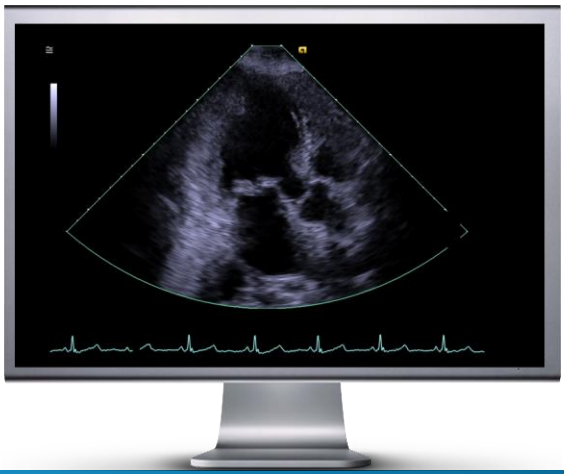
Clip #6

56 yo female with an autoimmune disease presents following a CVA



The mitral valve features show:

1. Severe rheumatic mitral stenosis
2. Bileaflet papillary fibroelastomas
3. Barlow's mitral valve
4. Libman-Sacks endocarditis

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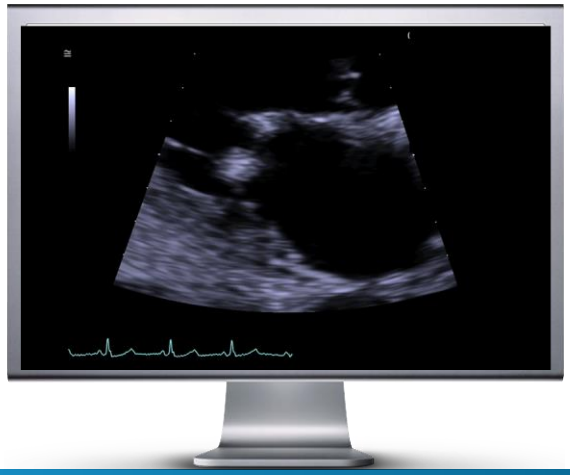
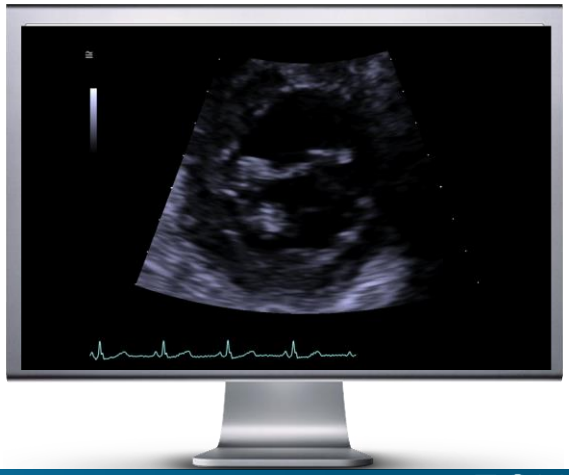
Libman-Sacks Endocarditis:

Nonbacterial endocarditis associated with systemic lupus erythematosus (SLE)





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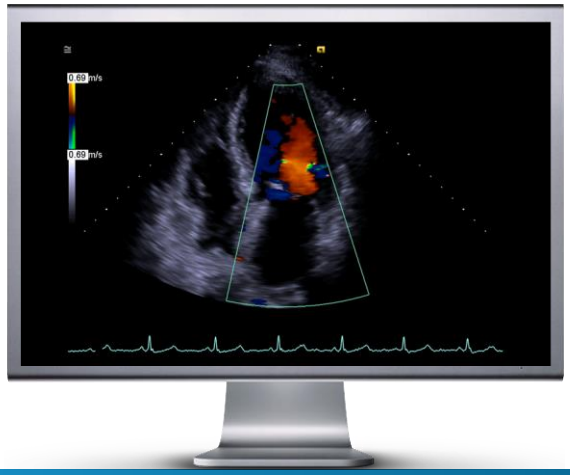
Libman-Sacks Endocarditis:

Extensive MV lesions can lead to significant MR



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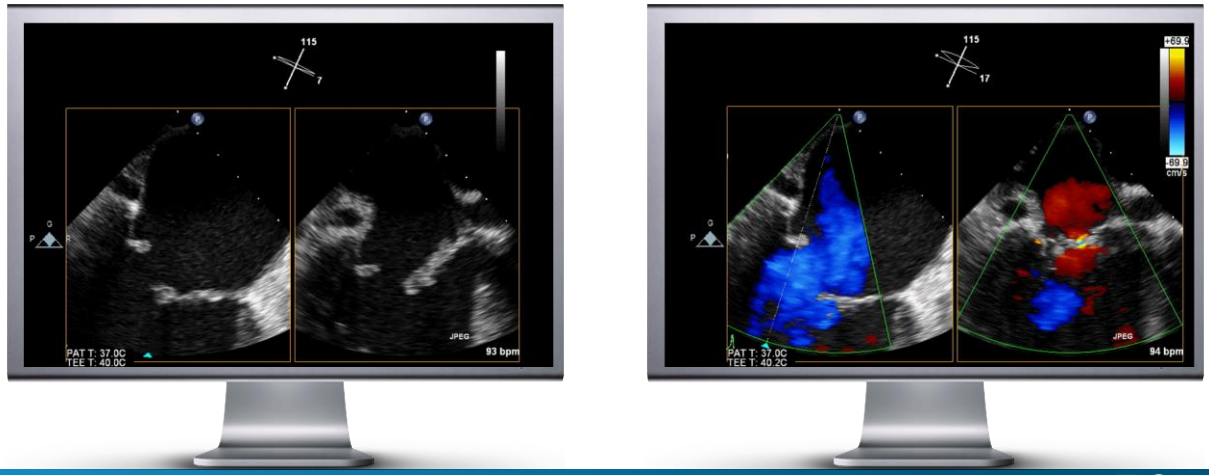
Libman-Sacks Endocarditis

31 yo male patient with Antiphospholipid Syndrome



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Libman-Sacks Vegetations

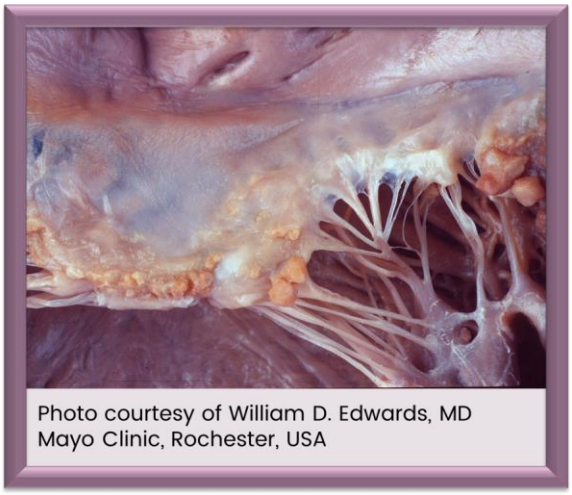

Photo courtesy of William D. Edwards, MD
Mayo Clinic, Rochester, USA

- Found in ≈ 1 in 10 patients with SLE
- Mitral valve most frequently involved
- Pts. with Libman-Sacks vegetations:
  - have a longer disease duration & higher disease activity
  - are at greater risk of cerebral ischaemic events

Moyssakis I, et al. Am J Med. 2007 Jul;120(7):636-42.

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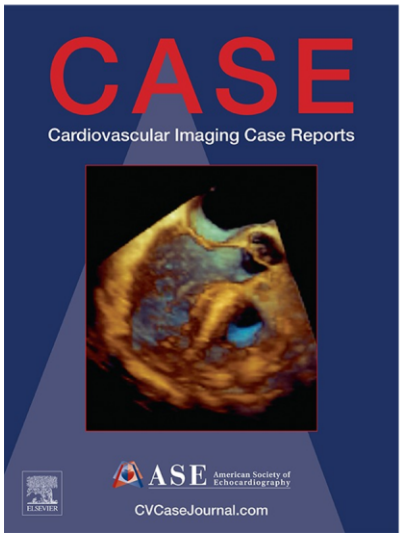
http://www.cvcasejournal.com/



If you have an interesting image…

Submit it to CASE Managing Editor Deborah R. Meyer at dmeyer@asecho.org

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References & Further Reading

- Barbosa MM, et al. **Doppler echocardiographic features of coronary artery fistula: report of 8 cases.** J Am Soc Echocardiogr. 1999 Feb;12(2):149-54.
- Butler TC, et al. **'A ring in the heart'.** Heart 2015;101:1953.
- Feigenbaum H. **Role of M-mode technique in today's echocardiography.** J Am Soc Echocardiogr. 2010 Mar;23(3):240-57; 335-7.
- Grimaldi A, et al. **Cardiac valve involvement in systemic diseases: a review.** Clin Cardiol. 2013 Mar;36(3):117-24.
- Miller DV. **Cardiac Tumors.** Surg Pathol Clin. 2012 Jun;5(2):453-83.
- Moyssakis I, et al. **Libman-Sacks endocarditis in systemic lupus erythematosus: prevalence, associations, and evolution.** Am J Med. 2007 Jul;120(7):636-42.
- Nagueh SF, et al. **Recommendations** for the **evaluation** of **left ventricular diastolic function** by **echocardiography.** J Am Soc Echocardiogr. **2009** Feb;22(2):107-33

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References & Further Reading

- Nishimura RA, et al. **Relation of pulmonary vein to mitral flow velocities by transesophageal Doppler echocardiography. Effect of different loading conditions.** Circulation. 1990 May;81(5):1488-97.
- Tahara N, et al. **Heterogeneous myocardial FDG uptake and the disease activity in cardiac sarcoidosis.** JACC Cardiovasc Imaging. 2010 Dec;3(12):1219-28.
- Wilkins CE, et al. **Coronary Artery Anomalies. A Review of More than 10,000 Patients from The Clayton Cardiovascular Laboratories.** Tex Heart Inst J. 1988; 15(3): 166–173.