

In a Song.. So Macho

Jim Newton
Oxford
June 2018

What year?

1. 1980
2. 1985
3. 1990
4. 1995

1985



What are the normal values?

Left ventricular size, mass & function

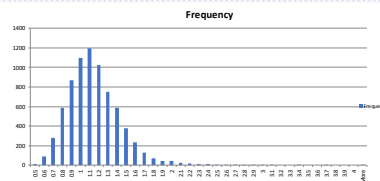
	Normal	Mild	Moderate	Severe
LV wall thickness IVSd / PWd (cm)	0.6-1.2	1.3-1.5	1.6-1.9	≥2.0

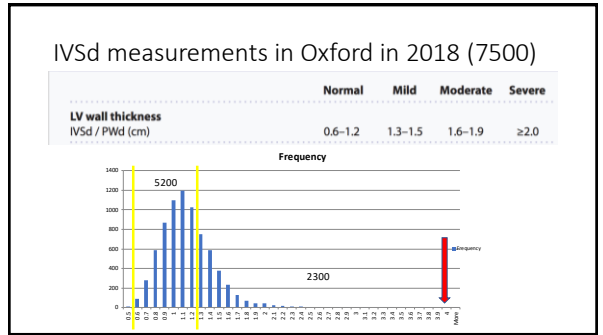
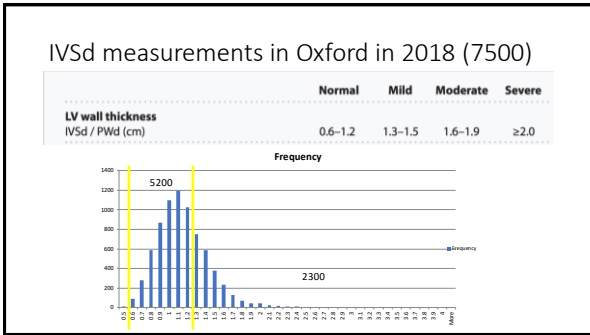
IVSd measurements in Oxford in 2018 (7500)

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IVSd measurements in Oxford in 2018 (7500)

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- ### How do you measure IVSd?
1. Always on m-mode
 2. Always on 2D
 3. Depends on image quality / alignment

What is the recommended way?

European Heart Journal - Cardiovascular Imaging 2015; 16, 203–211

POSITION PAPER

Recommendations for Cardiac Chamber Quantification by Echocardiography in Adults: An Update from the American Society of Echocardiography and the European Association of Cardiovascular Imaging

Roberto M. Lang, MD, FASE, FESC, Luigi P. Badano, MD, PhD, FESC, Victor Mor-Avi, PhD, FASE, Jonathan Alfalo, MD, MS, Anderson Armstrong, MD, MS, Laura Ernande, MD, PhD, Frank A. Flachskampf, MD, FESC, Elyse Foster, MD, FASE, Steven A. Galisstein, MD, Tatiana Kuznetsova, MD, PhD, Patricia Lancellotti, MD, PhD, FESC, Denisa Muraru, MD, PhD, Michael H. Picard, MD, FASE, Ernst R. Rietzschel, MD, PhD, Lawrence Rudski, MD, FASE, Kirk T. Spencer, MD, FASE, Wendy Tsang, MD, and Genevieve Yang, MD, PhD, FESC.

2D recommended

2D-guided linear measurements

- Facilitates orientation perpendicular to the ventricular long axis

Measure the true septal thickness

Incorrect

The trabeculation was measured as part of the IVS measurement causing the thickness of the septum to be over estimated

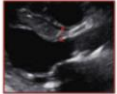
Correct

The gains, TGCs and focus were adjusted to help clearly define the endocardial border and the RV trabeculation. The IVS was correctly measured and did NOT include the trabeculations

Measure the true septal thickness

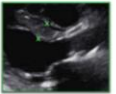
Incorrect

The septum was measured at the tapered section of the IVS which under estimates the true thickness and severity of left ventricular hypertrophy



Correct

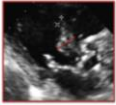
The callipers were placed more apically allowing for the full thickness of the septum to be correctly measured. As long as the measurement remains within the basal section of the heart it is ok to choose a location that allows for a more accurate measurement



Measure the true septal thickness


Incorrect

It would be incorrect to measure the IVS in the bulge of a Sigmoid Septum. The sonographer was correct to measure more apically

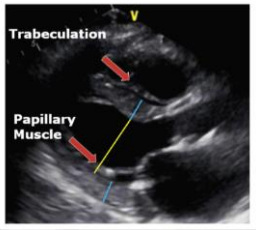
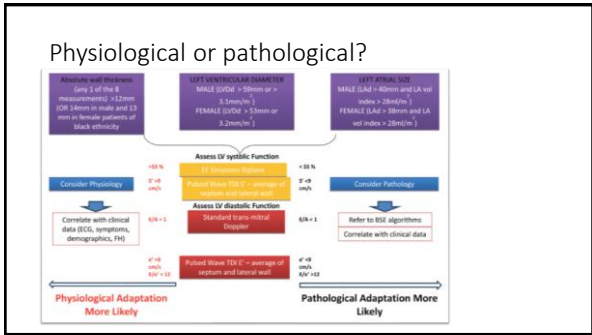


Correct

In this image the sonographer correctly measured the IVS more apically than usual to avoid the bulge.



Measure the true septal thickness

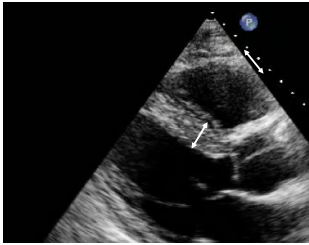



- ### Pathological causes of hypertrophy
1. Hypertension
 2. Aortic stenosis
 3. Hypertrophic cardiomyopathy
 4. Amyloid
 5. Fabry disease

LVH? – a 55 year old male



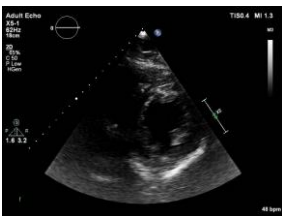
LVH? – septum measured 17mm



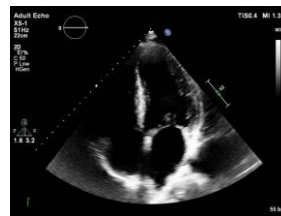
LVH? – what else do you see?



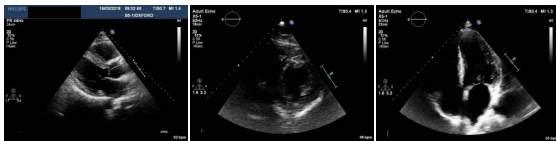
LVH – what else can you see?



LVH – what else can you see?



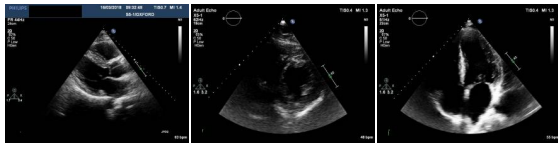
Diagnosis?



Pathological causes of hypertrophy

1. Hypertension
2. Aortic stenosis
3. Hypertrophic cardiomyopathy
4. Amyloid
5. Fabry disease

Diagnosis?

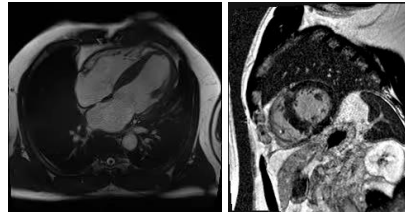


Subtle SAM

Asymmetric hypertrophy

Bright septum

HCM confirmed on CMR



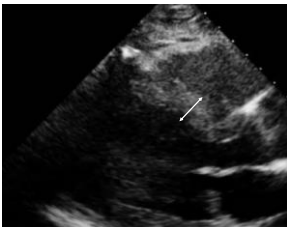
Diagnosis of hypertrophic cardiomyopathy

- Increased wall thickness >15mm
- Typically asymmetric
- Only 25% have LVOT obstruction at rest
- But 75% develop LVOT obstruction with exercise
- 4% have symmetrical hypertrophy
- Increased E/E' often seen

LVH? – in a 38 year old male



LVH? – septum measures 17mm



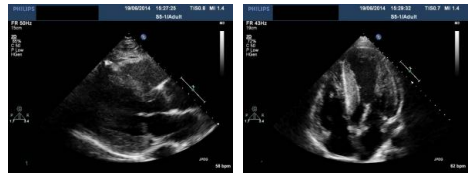
LVH – what else do you see?



LVH – what else do you see?



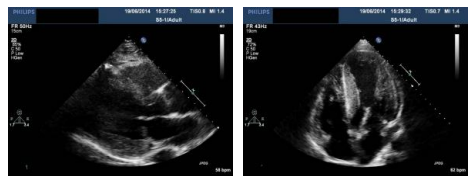
Diagnosis?



Pathological causes of hypertrophy

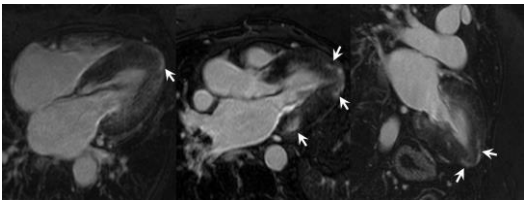
1. Hypertension
2. Aortic stenosis
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Diagnosis?



Symmetrical hypertrophy
Papillary muscle hypertrophy? SAM of AMVL

Confirmed as Fabry's disease



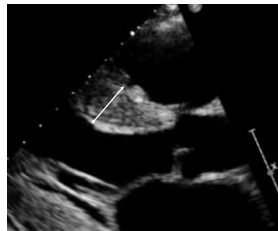
Echo in Fabry's disease

- Concentric hypertrophy
- Usually non-obstructive
- Right ventricular hypertrophy common
- Papillary muscle hypertrophy
- Reduced tissue doppler velocities
- Late fall in ejection fraction

LVH? – a 47 year old African male



LVH? – septum measured 21mm



LVH – what else can you see?



LVH – what else can you see?



LVH – Diagnosis?



Pathological causes of hypertrophy

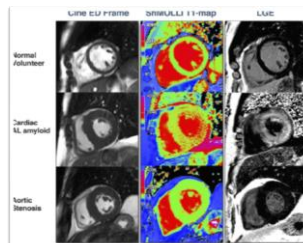
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LVH – Diagnosis?



Symmetrical hypertrophy
Poor long axis function
Pericardial fluid
RV involvement
Defibrillator lead

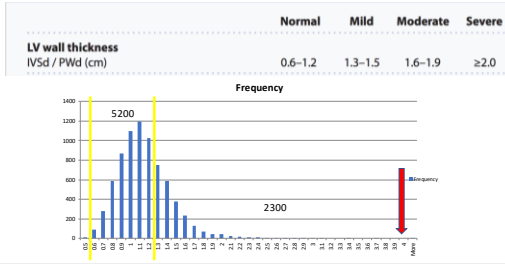
Cardiac amyloid



Diagnosis of cardiac amyloid

- Loss of long axis function
- Reduced tissue Doppler velocities (all of them)
- Unusual echo texture of myocardium
- Left ventricular hypertrophy
- Right ventricular hypertrophy
- Thickened AV valves
- Dynamic outflow obstruction can occur

IVSd measurements in Oxford in 2018 (7500)



LVH? – 15 year old male



LVH? – septum measured 33mm



LVH – what else can you see?



LVH – what else can you see?



LVH – what else can you see?



LVH – Diagnosis?



Pathological causes of hypertrophy

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LVH – Diagnosis?



Severe asymmetric LVH

SAM

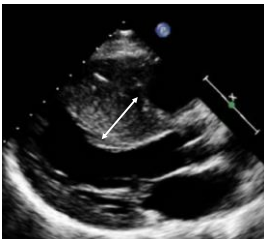
LVH – Confirmed as HCM in 15 year old



LVH? – in a 60 year old female



LVH? – septum measured as 38mm



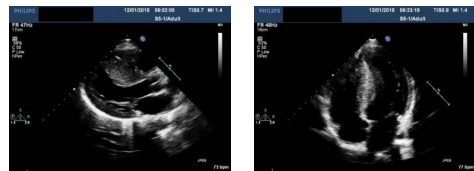
LVH – what else do you see?



LVH – what else do you see?



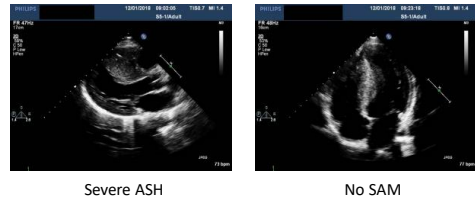
Diagnosis?



Pathological causes of hypertrophy

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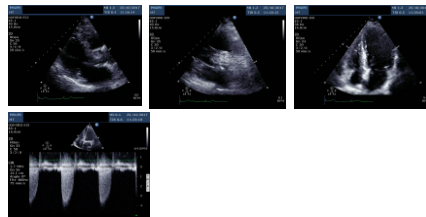
Diagnosis?



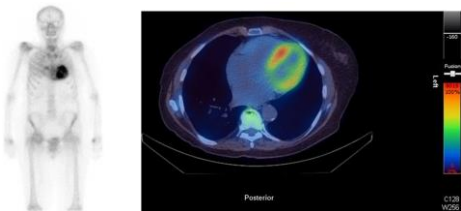
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LVH - what else do you see?

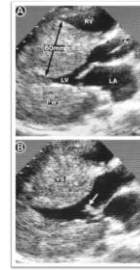
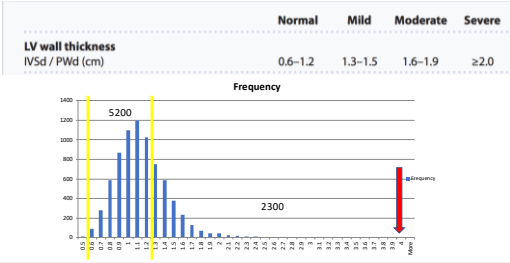


LVH - Aortic stenosis and amyloid



LVH

Septum of 40mm a world record?

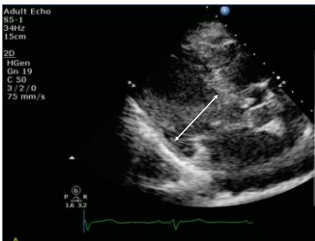


Extreme Left Ventricular Hypertrophy

by Barry J. Maron, Brian W. Gross, and Stephen I. Stark

Circulation
Volume 92(9):2748-2748
November 1, 1995

LVIDd mislabeled as IVSd...



Other techniques

