香港中文大學
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香港中文大學醫學院
Faculty of Medicine
The Chinese University of Hong Kong

35th Anniversary 三十五週年

Features of cardiac tumours on echocardiogram - what a cardiologist should know

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Cardiac tumours

- Primary cardiac tumours
  - Rare, <0.1%
  - 75% are benign
  - Presentation depending on locations of mass
    - Rt or Lt sided heart failure, arrhythmia or embolic events
- Secondary cardiac tumours
  - Metastatic neoplasms
  - 20-40 times more common than primary cardiac tumours

Primary cardiac tumours

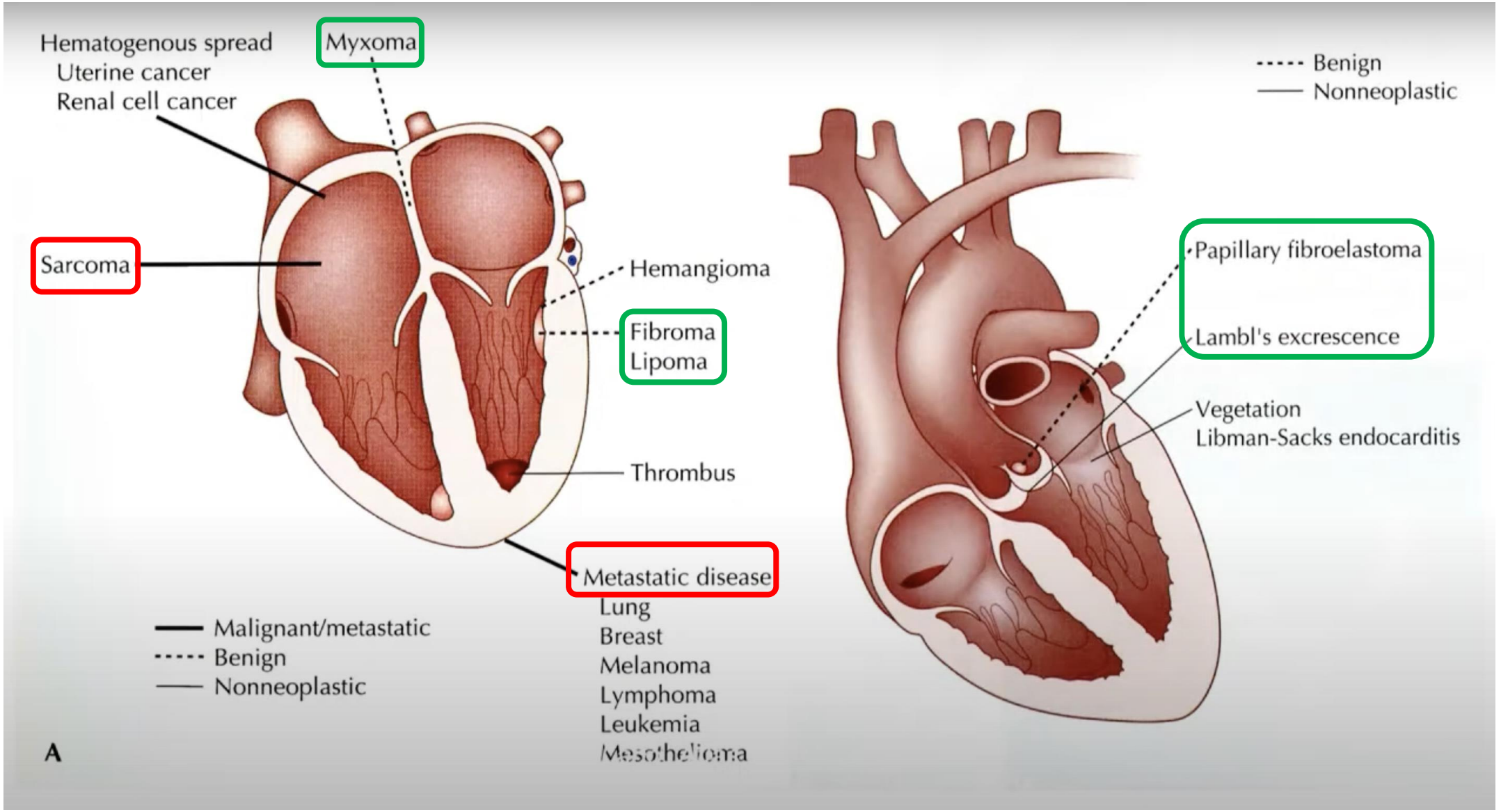
Benign (75%)

- Well-circumscribed
- Most common myxoma
- Usually occur at left atrium (80%)

Malignant (25%)

- Usually invasive, involve cardiac structures and with pericardial effusion
- Involve myocardium and endocardial surfaces
- Most common are sarcoma
- >50% of RA tumours are sarcoma

Location

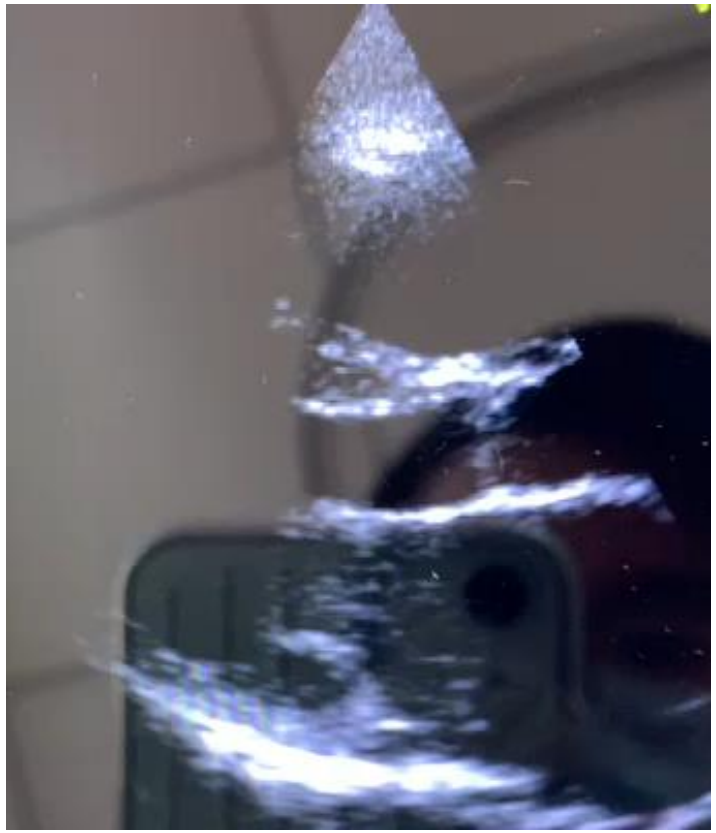

Hematogenous spread
Uterine cancer
Renal cell cancer
Myxoma
Sarcoma
Hemangioma
Fibroma
Lipoma
Thrombus
Metastatic disease
Lung
Breast
Melanoma
Lymphoma
Leukemia
Mesothelioma
Malignant/metastatic
Benign
Nonneoplastic
A
Benign
Nonneoplastic
Papillary fibroelastoma
Lambl's excrescence
Vegetation
Libman-Sacks endocarditis

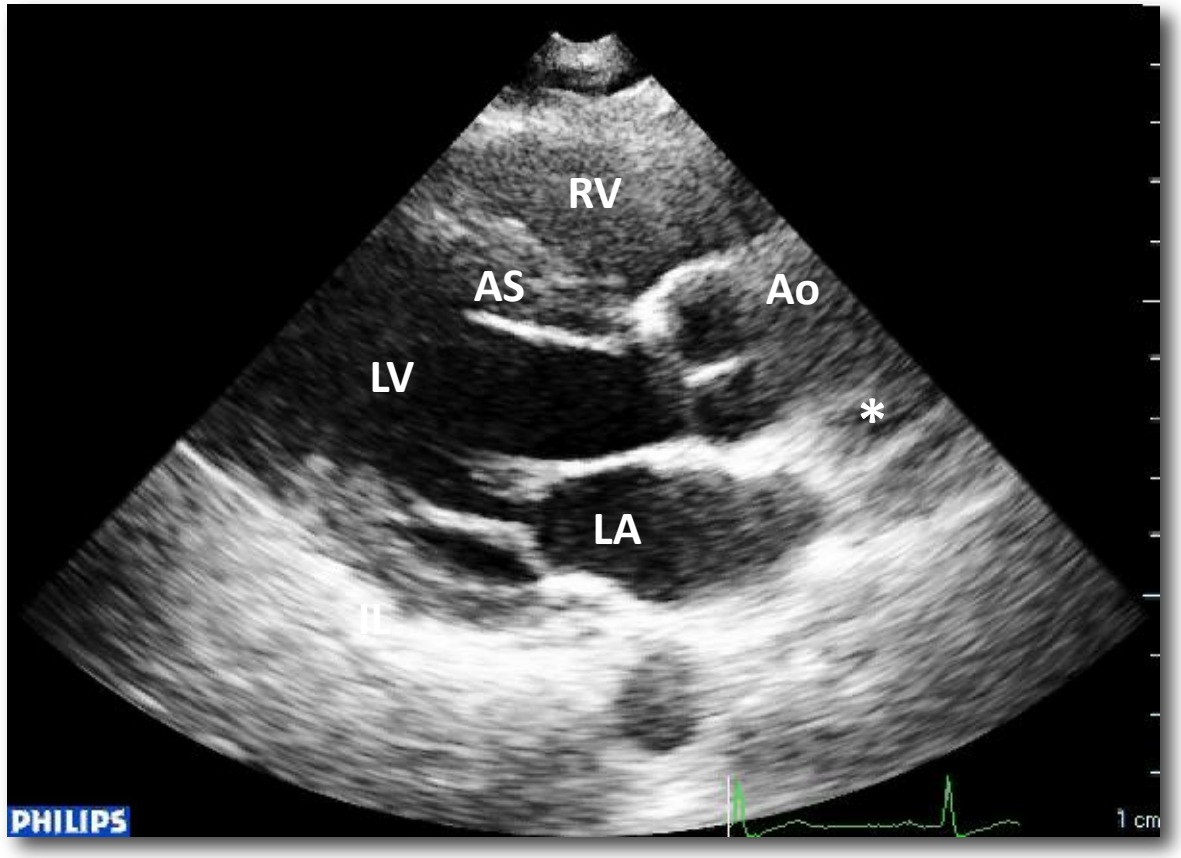
Atrial masses

Atrial myxoma – most common LA mass

- True myxoma arises from mural endocardium
  - Account for 80% of primary cardiac tumours
- Typically attached to **left fossa ovalis**
  - LA > RA > biatrial > ventricular
  - “Dumbbell Myxoma” - spans fossa, both RA, LA
  - “Atypical Myxoma” - attach to MV or AV
- Can prolapse through MV
  - Symptoms of MV obstruction or stenosis
  - Repeated trauma may cause valvular damage
- May present with weight loss, fever etc

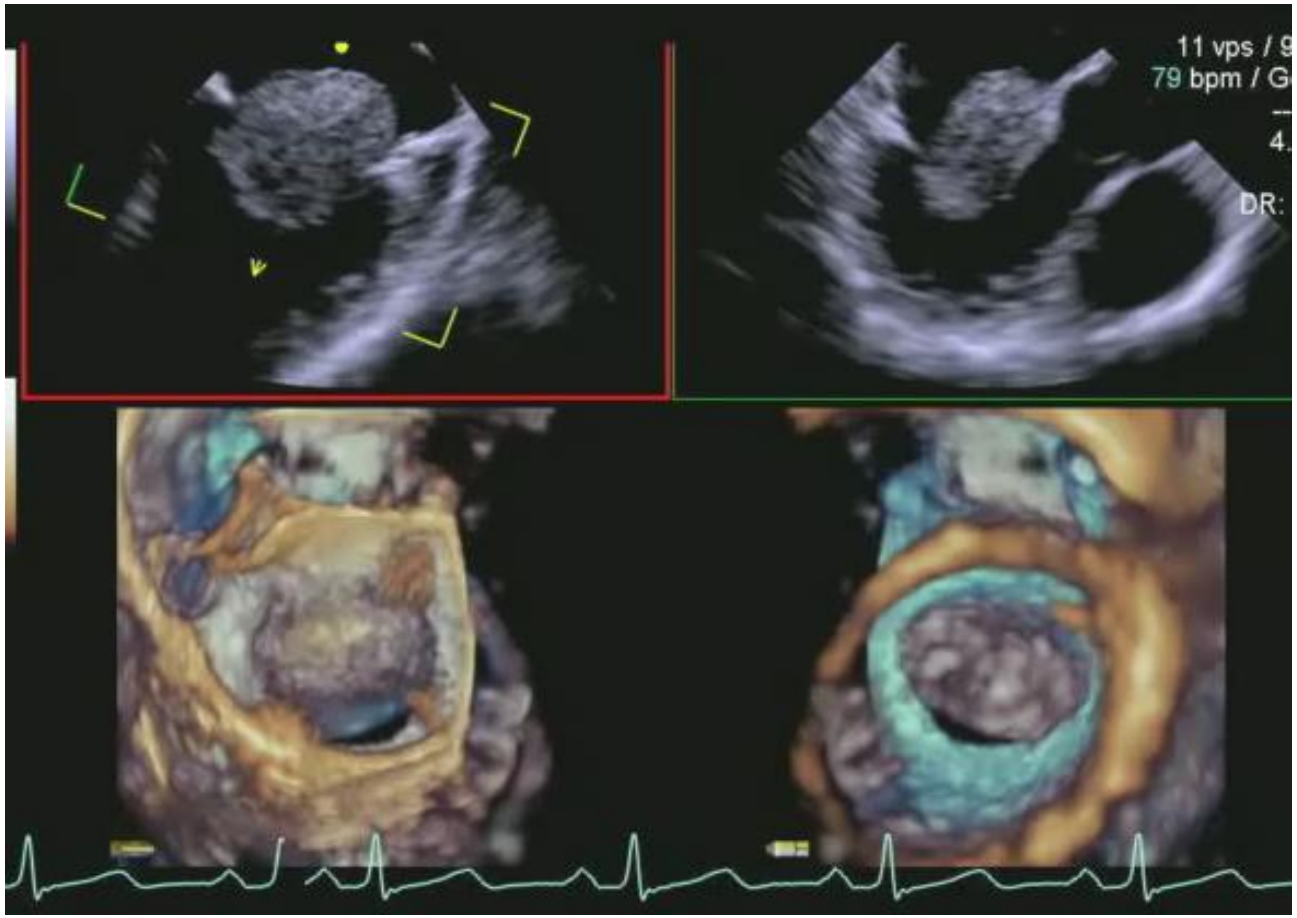
Developed cardiogenic shock, BP 72/34, P 138



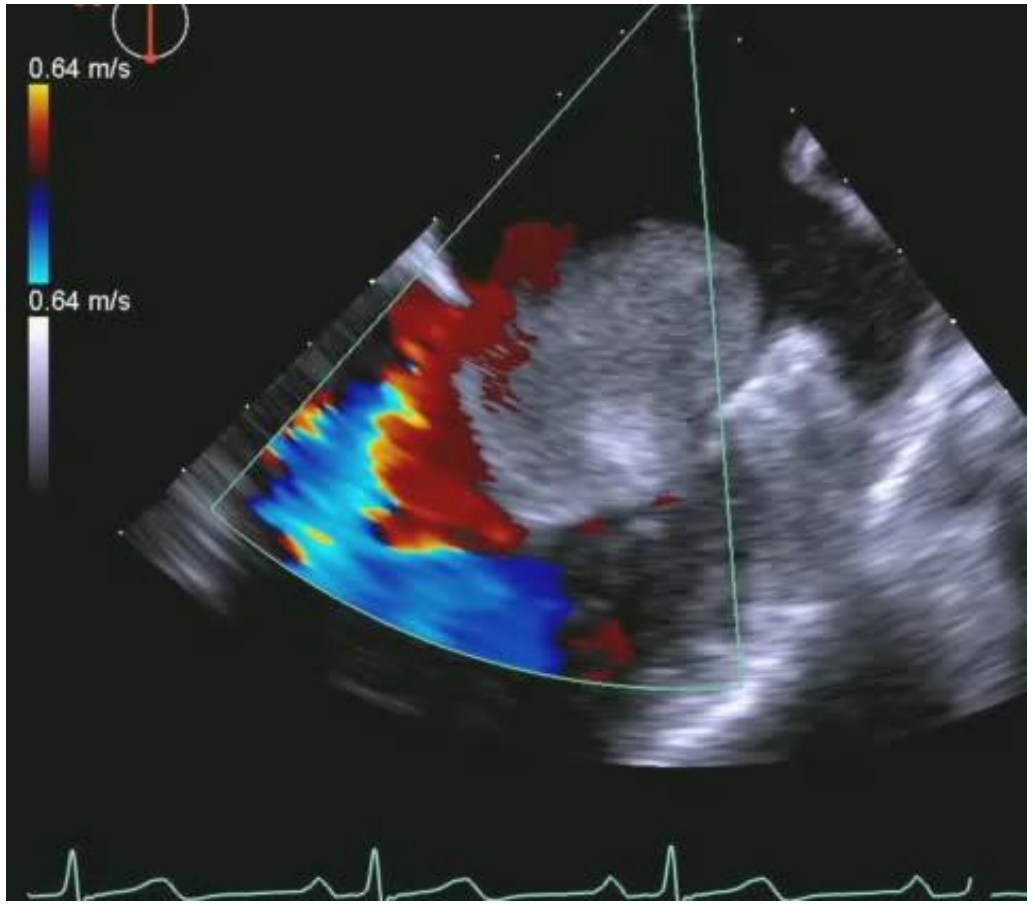


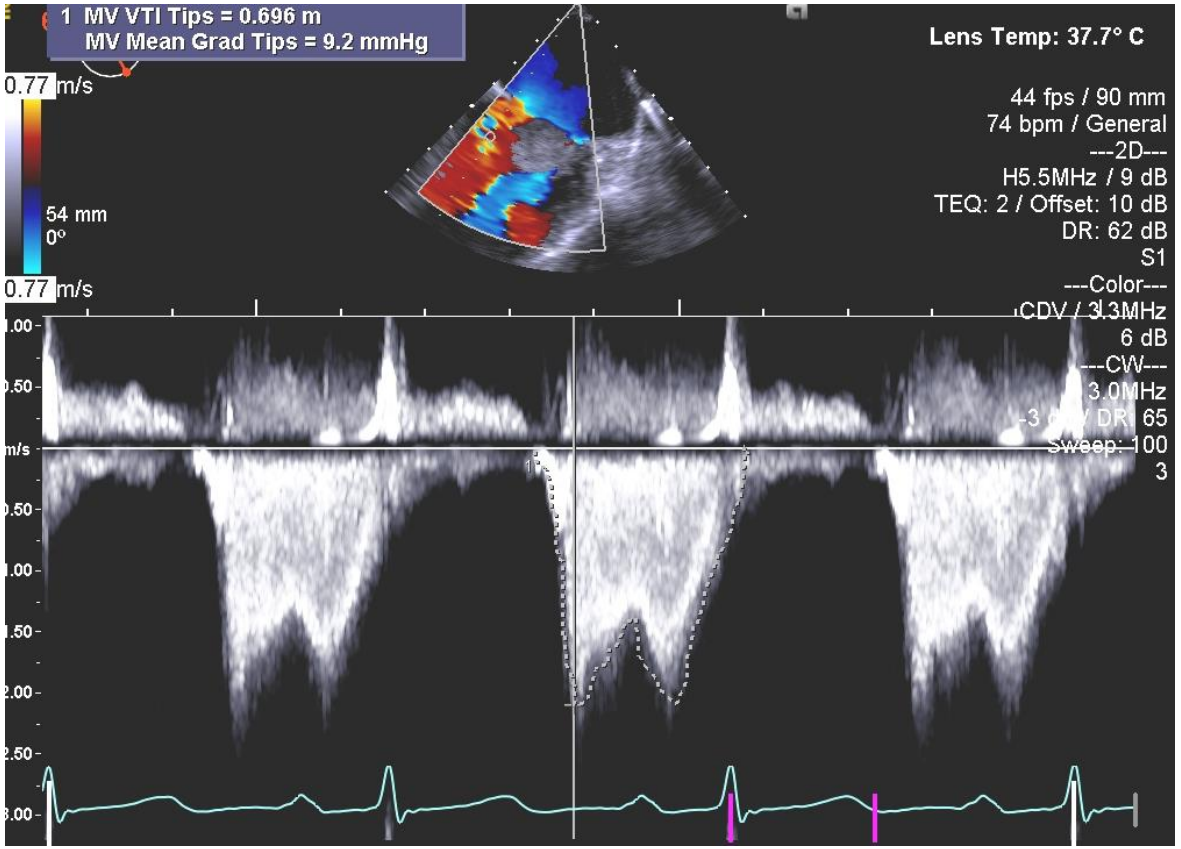
Dx: Left Atrial Myxoma (Echo diagnosis)

Emergency LA mass excision was done



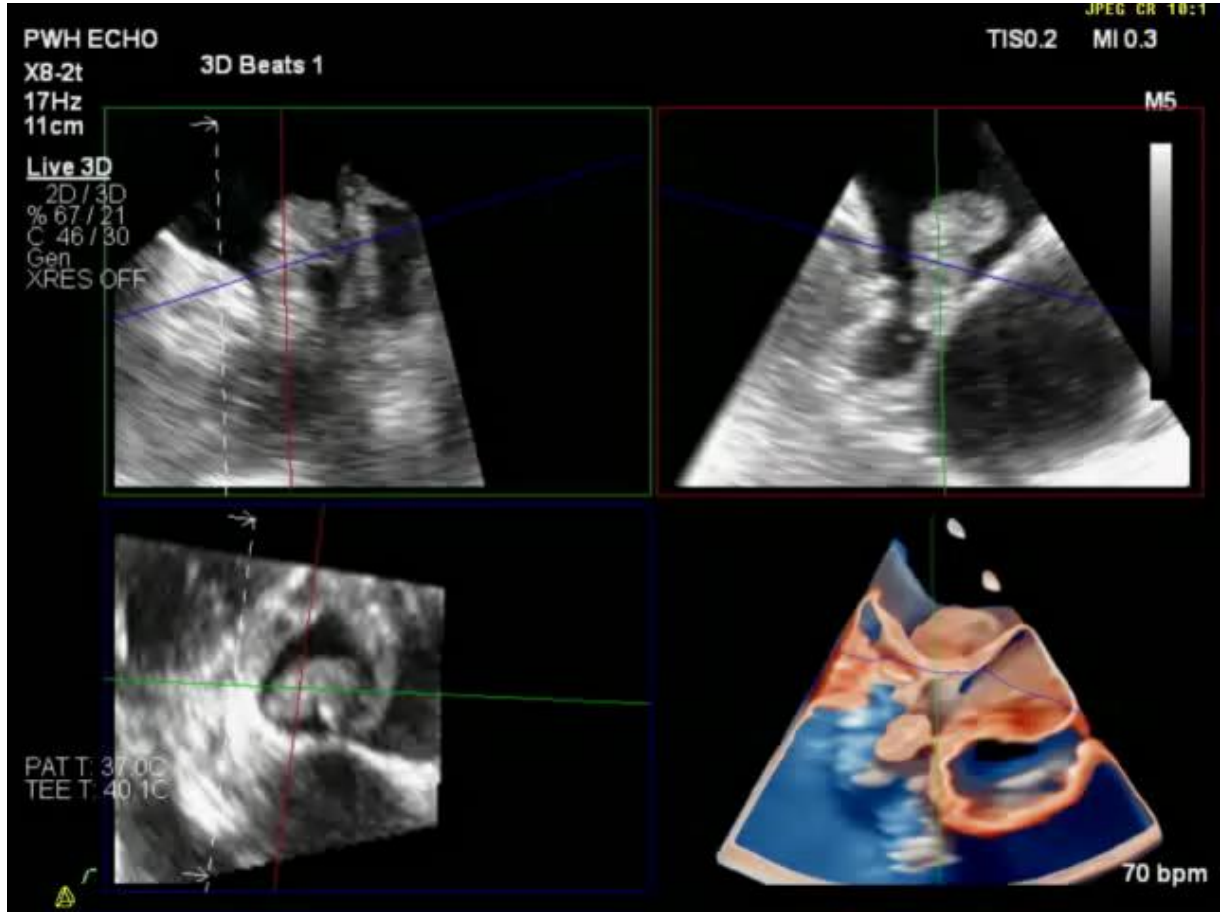
Reason of cardiogenic shock is mitral valve obstruction





DDx of LA mass

- Left atrial or left atrial appendage thrombus
- Atrial sarcoma
- Atrial metastatic cancer

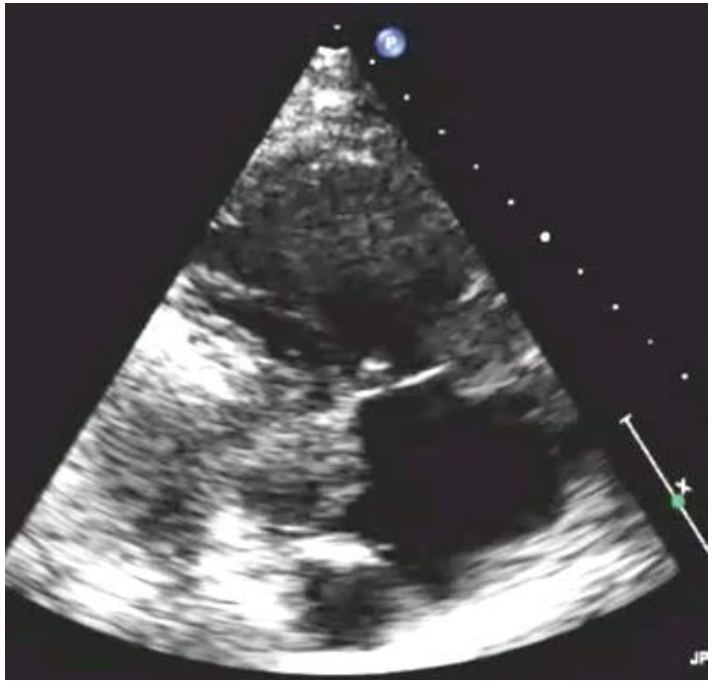


Right atrial mass

- 50% eventually found out to be sarcoma (e.g. angiosarcoma)
- Sizable, may cause RV inflow (TV) obstruction (similar to tricuspid stenosis)
- Present with Rt heart failure symptoms
- Associated with pericardial effusion at RA free wall
- Poor prognosis as progressive disease

Rt atrial mass

- M/65
- Progressive SOB, orthopnoea, leg swelling and dry cough
- Echo: normal EF, moderate pericardial effusion with tapping done, cytology T/F
- Presence of RA mass measuring 3.2x2.5cm
- What will be the Echo dx?



Pericardial cytology show high grade B cell NHL

- Accumulation of pericardial fluid

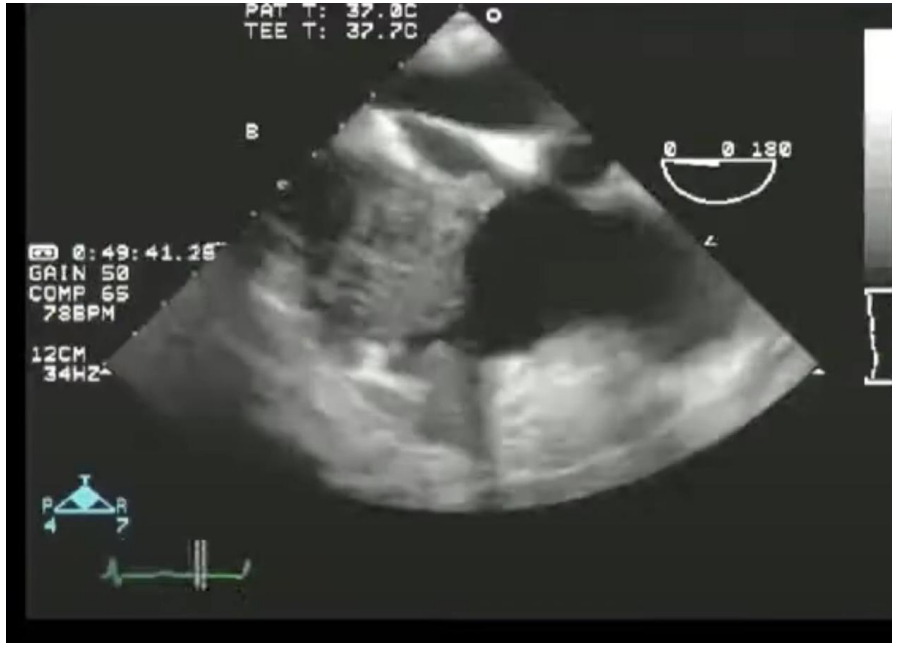
  -> tapping done
- Private PET-CT: two hypermetabolic cardiac masses at RA, pericardial / pleural effusions, multiple mediastinal LNs
- BM exam: negative for involvement
- Tx as DLBCL with R-CHOP with GCSF cover
- RA lymphoma has largely resolved, no recurrence of HF symptoms

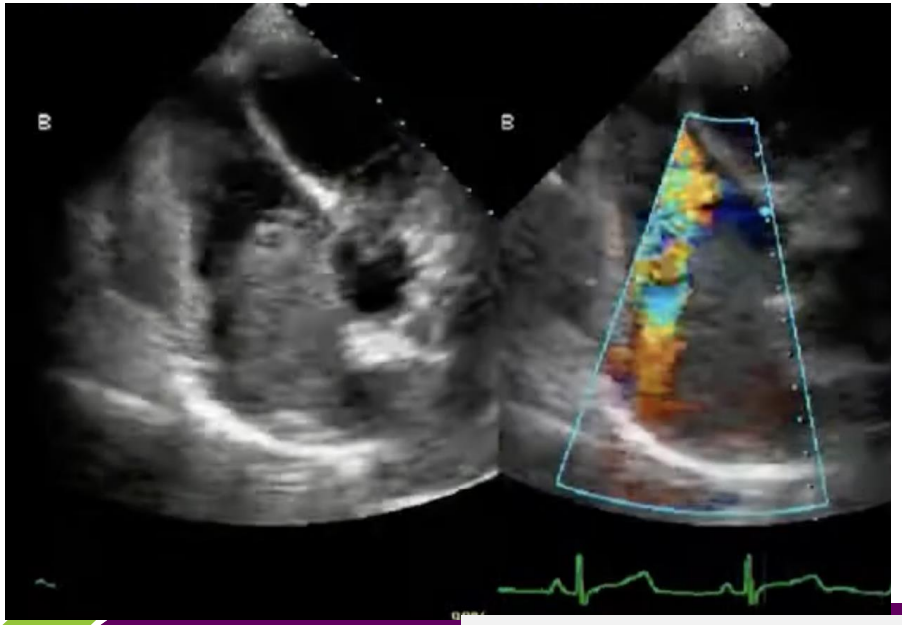
Before R-CHOP

After R-CHOP

DDx of RA mass

- Atrial sarcoma
- Atrial metastatic cancer
- RA thrombus / RAA thrombus (rare)
  - Associate with pacing lead, HD catheter, central venous catheter etc.

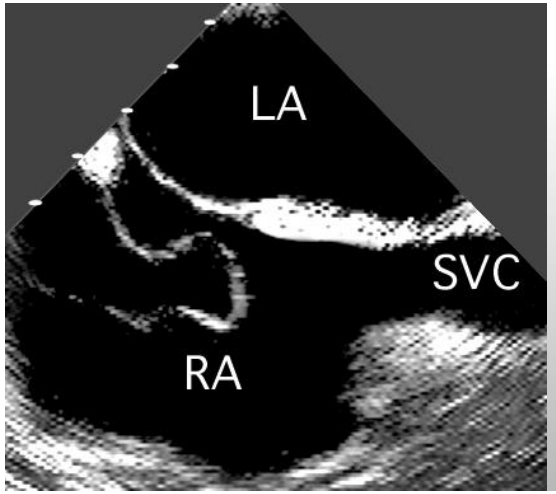


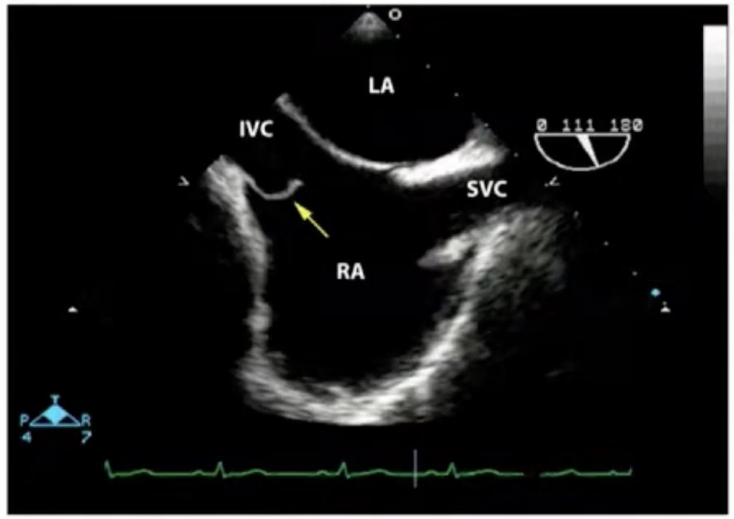


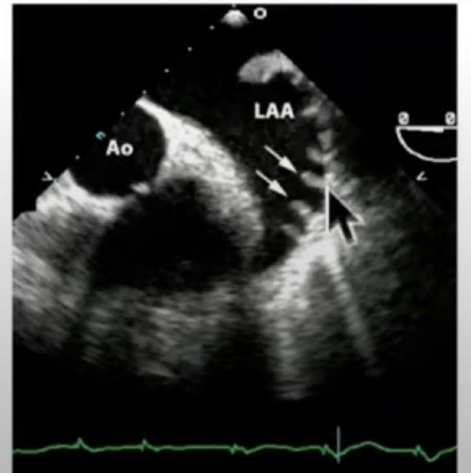
Courtesy of Dr R Lang

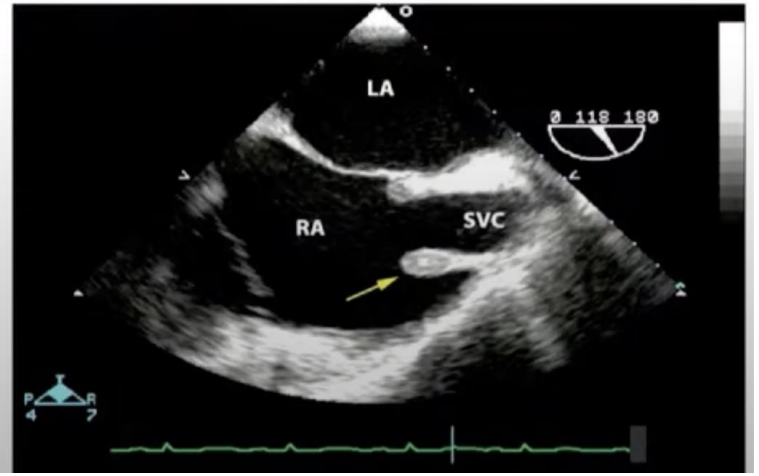
Normal cardiac structures

- Eustachian valve / Chiari network
- Lipomatous atrial septum
- Pectinate muscle of LAA
- Ridge of LAA / RAA
- Crista terminalis









Courtesy of Dr R Lang

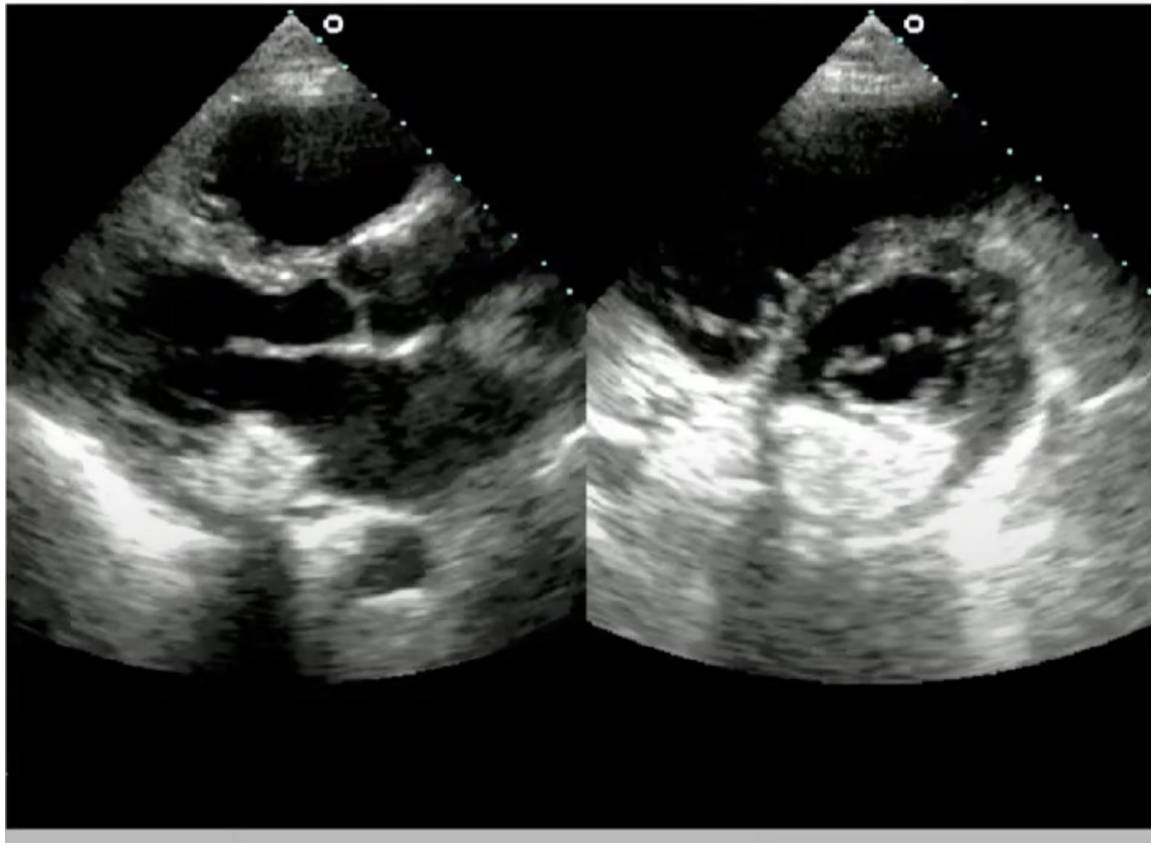
Ventricular masses

Ventricular tumours

- Intracavitary or intramural
- Present with HF symptoms, obstruction or ventricular ectopics / VT
- Angiomas – AV block
- Fibromas, rhabdomyomas – PVCs, VT, SCD
- Can be rapidly progressive, may mimic restrictive cardiomyopathy

Fibroma

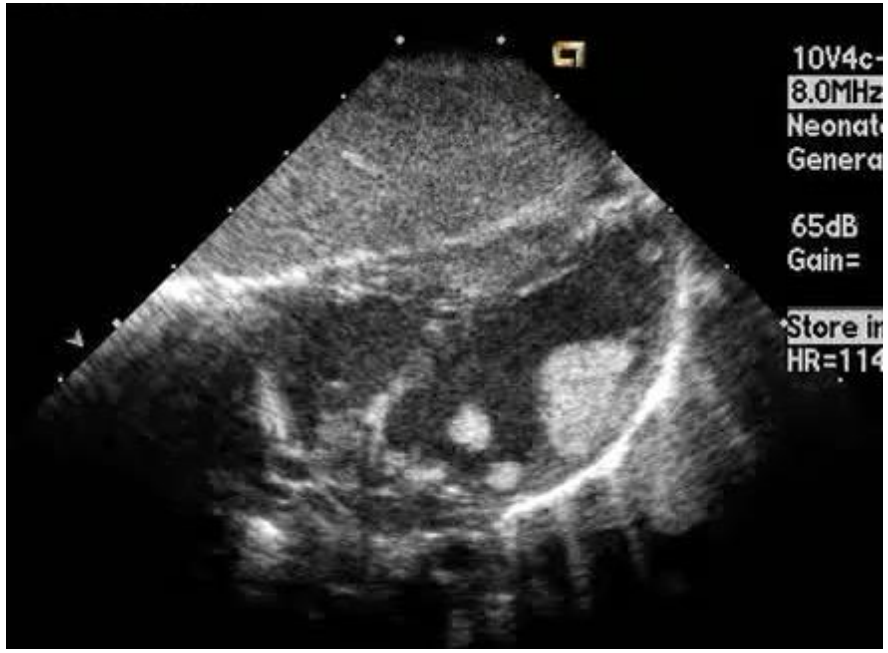
- Benign non-encapsulated tumour
- Most common tumour in children <10
- Large tumour mass (5-10cm)
- Located within myocardium and hyperechoic
  - Free wall
  - Interventricular septum
  - Posterior wall (less frequent)

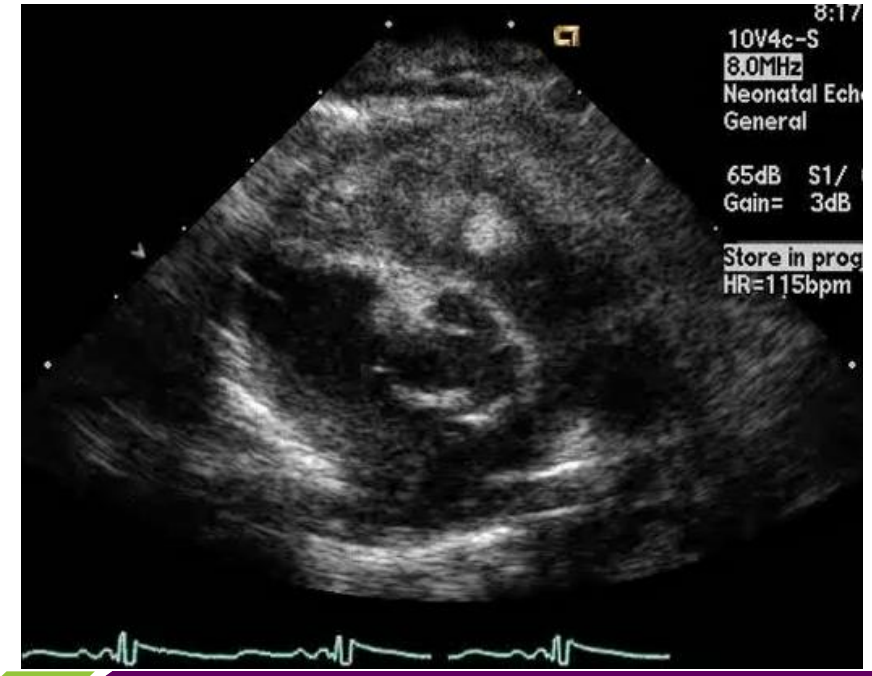


Courtesy of Dr R Lang

Rhabdomyoma

- Benign
- Another common cardiac tumor in children
- >50% associated with tuberous sclerosis
- Often multiple, frequently regress in size and number spontaneously after birth
- Increased incidence of pre-excitation
- Surgical excision is outflow tract obstruction or refractory arrhythmias

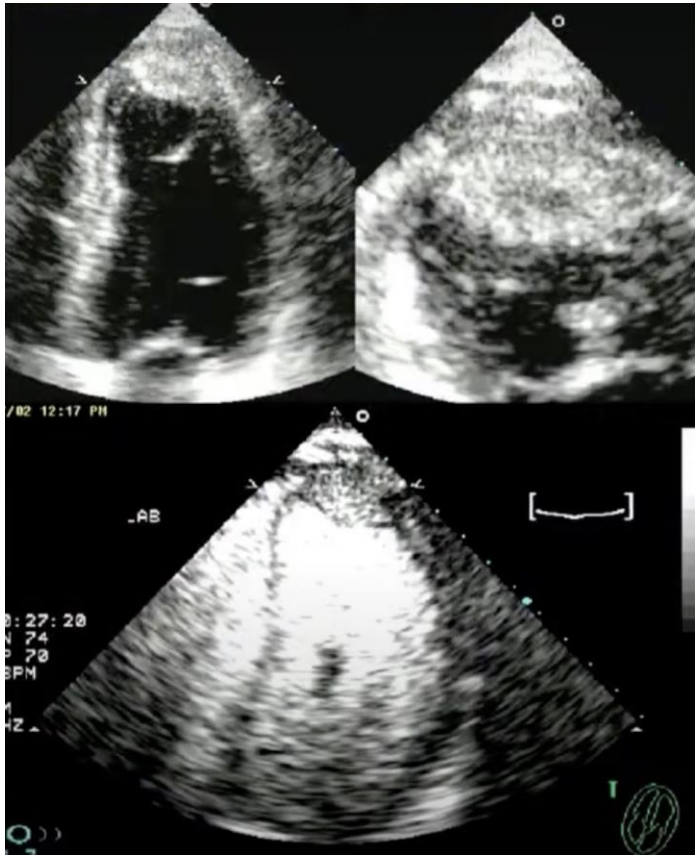




Courtesy of Dr Bonnichsen

DDx of LV mass

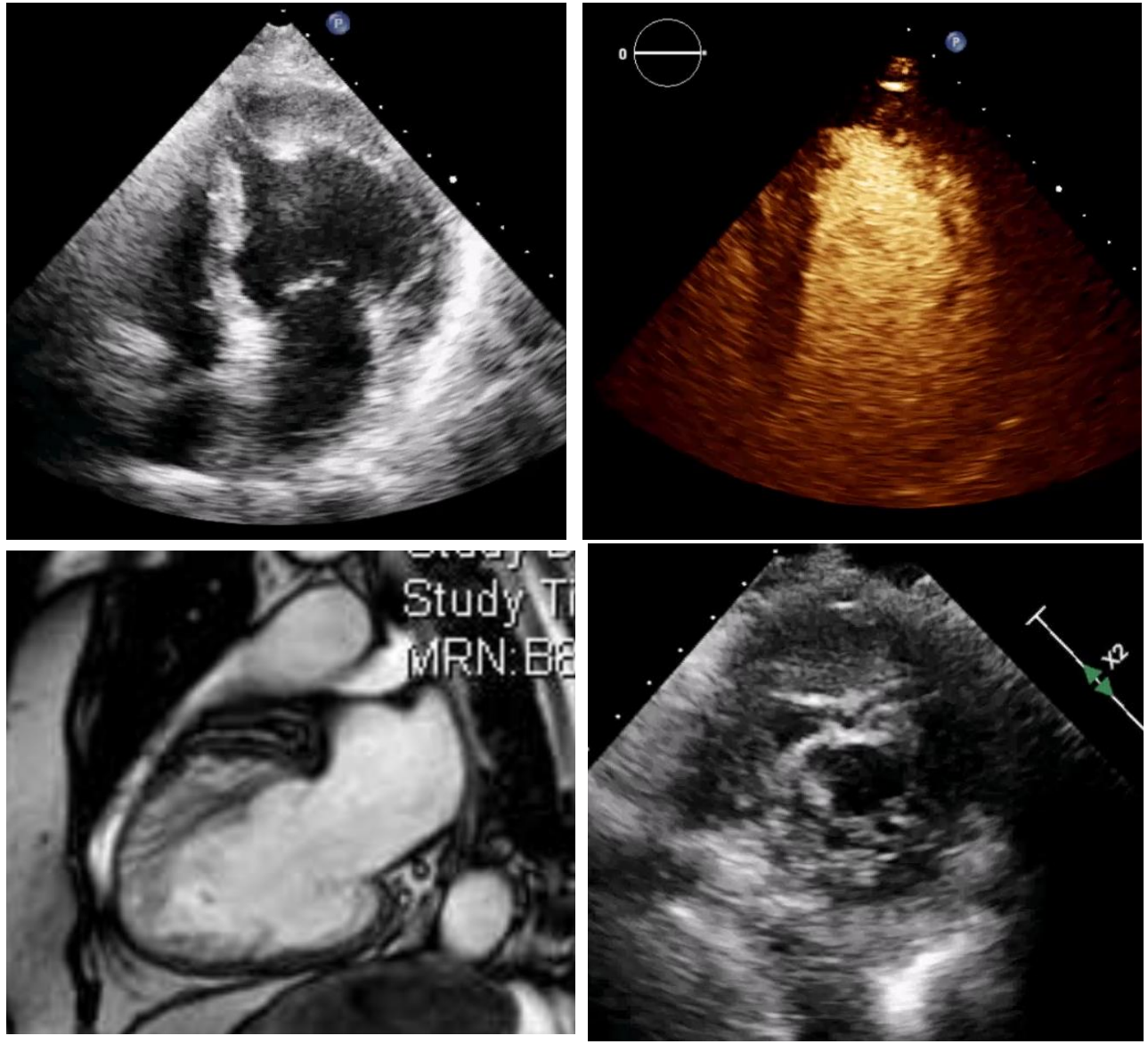
- Haemangioma
  - Very rare, vascular tumour, lateral LV, anterior RV, contrast enhancement
- Sarcoma or lymphoma
  - Ventricular free wall or septum
- **Apical thrombus**
- Non-compaction cardiomyopathy (mimicker)
- Hypereosinophilic syndrome (mimicker)



Courtesy of Dr R Lang

LV non-compaction

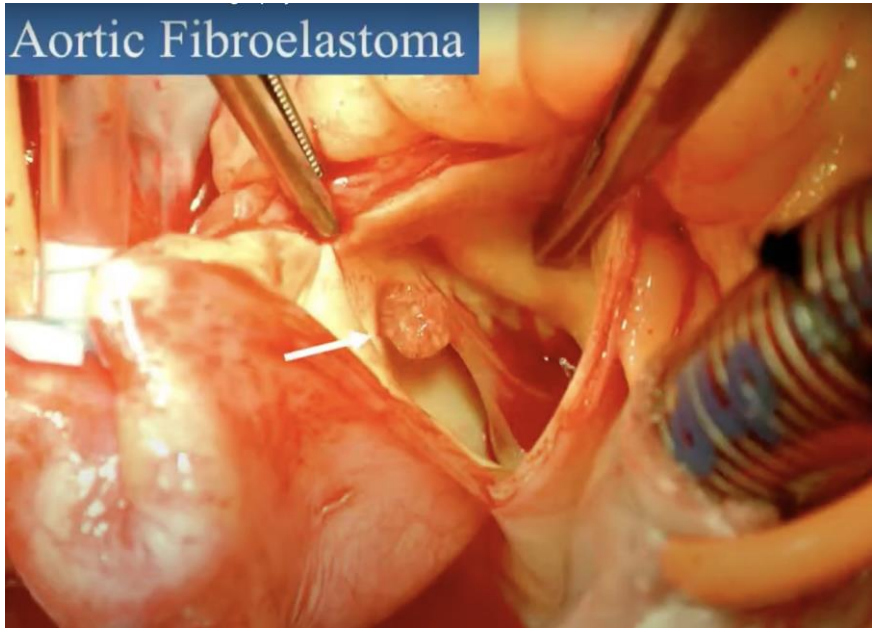
- Characterized by compacted and non-compacted layers (tracebulations) of ventricular myocardium
  - Deep recesses between trabeculations communicate with LV cavity
  - **Trabeculations are most commonly located at apex**, mid ventricular lateral and inferior walls
- Presented with CHF, arrhythmias (SVT, VT), SCD, thromboembolic disease, asymptomatic
- Jenni criteria : non-compacted to compacted myocardium > 2:1 in end systole

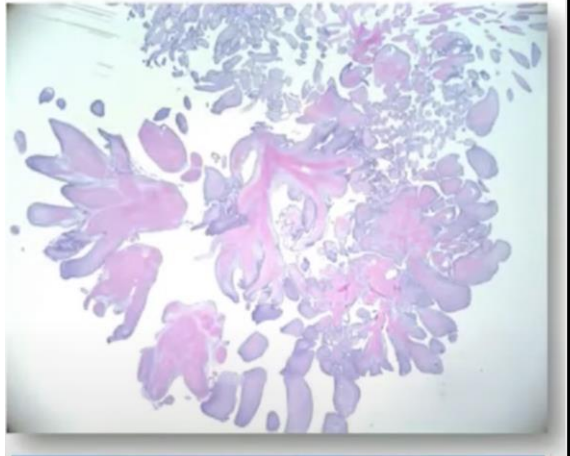


Valvular masses

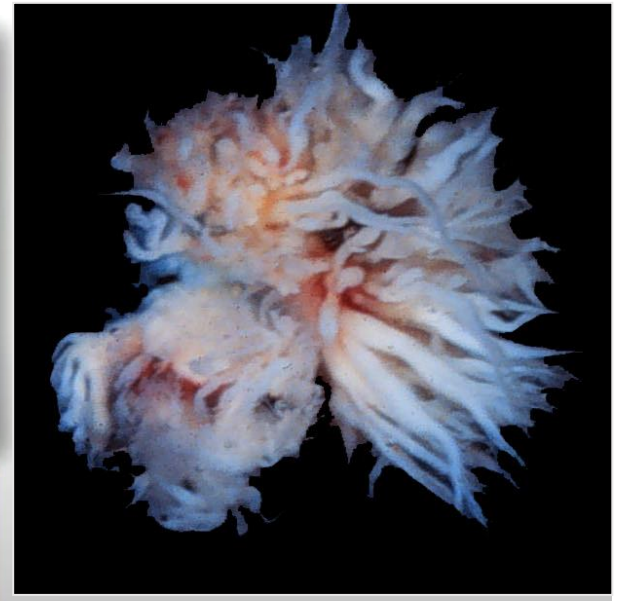
Papillary fibroelastoma

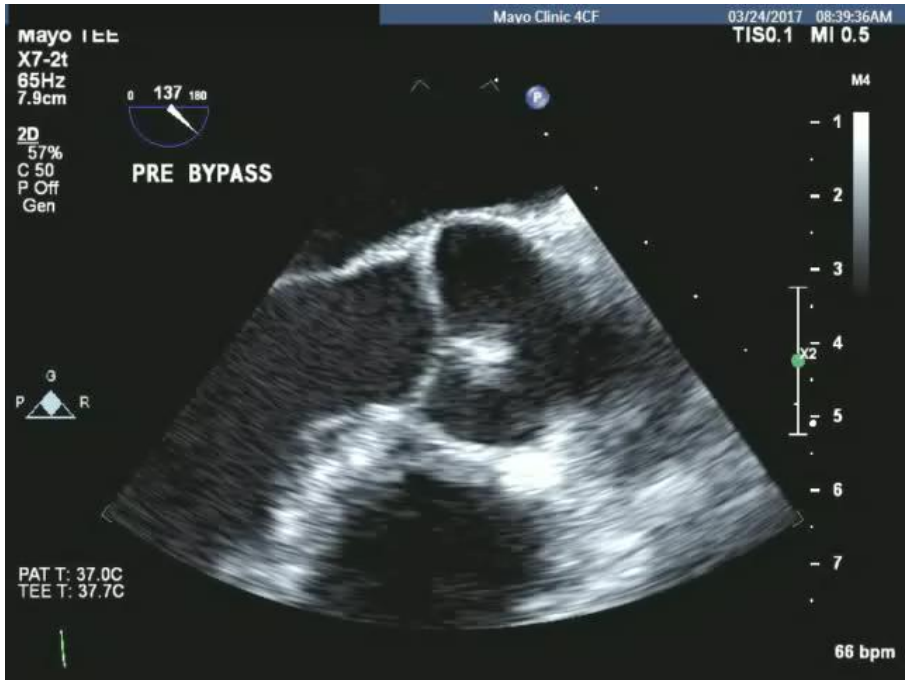
- Attached to aortic surface of AV or ventricular surface of MV (downstream)
- Typically not associated with regurgitation
- Small, solitary, can be highly mobile
- May be attached to chordae and endocardium
- Sea anemone appearance
- > 1cm, high mobility, embolic event => indicated for surgery





Avascular fronds (papillae)
containing a core of dense collagen fibers admixed with varying amounts of reticulin and elastin fibers.

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2D
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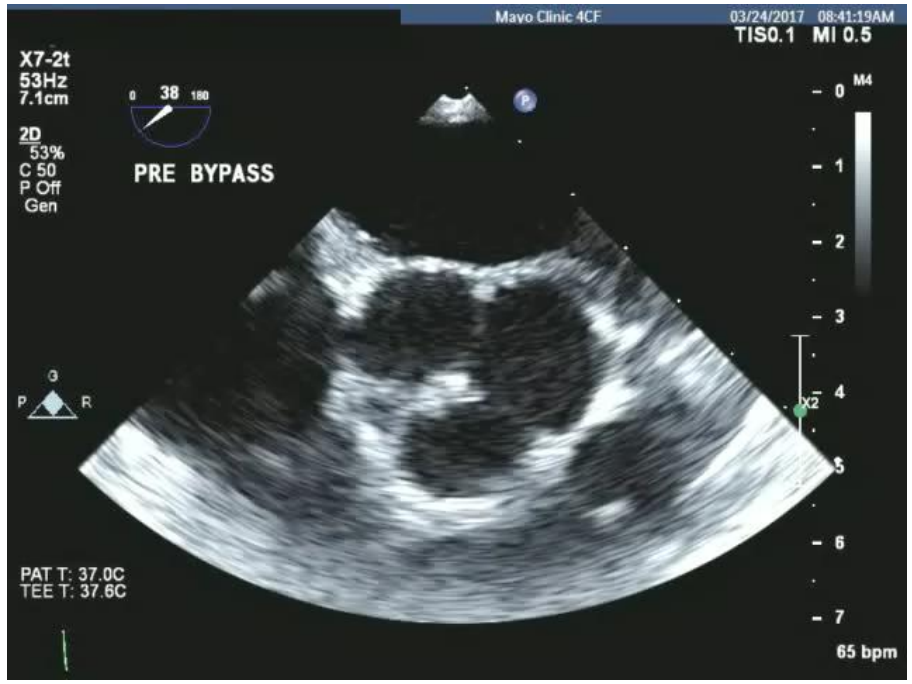
TEE T: 37.7C
66 bpm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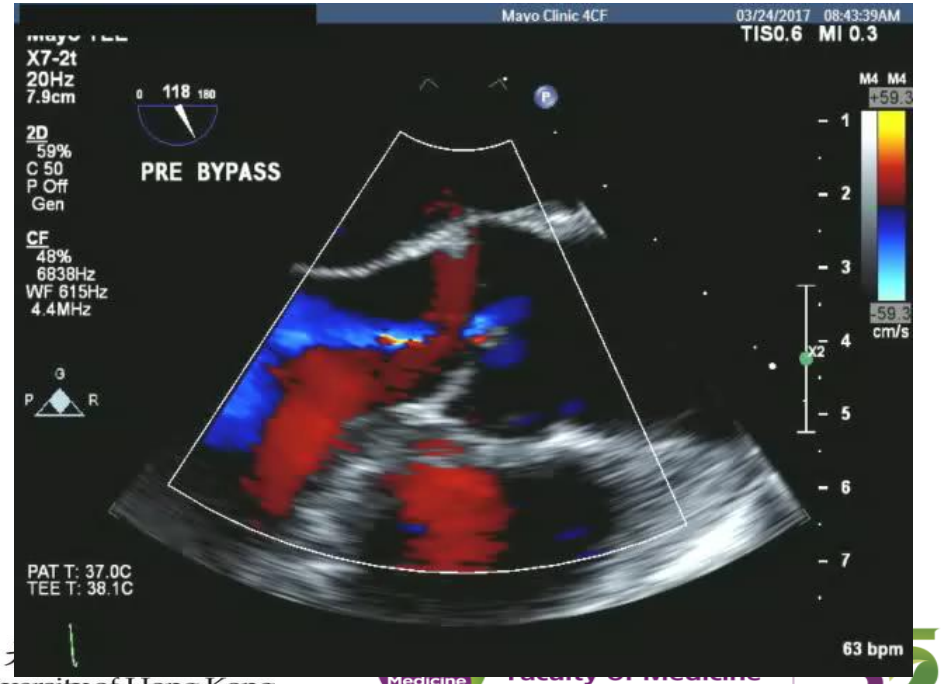
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TEE T: 38.1C
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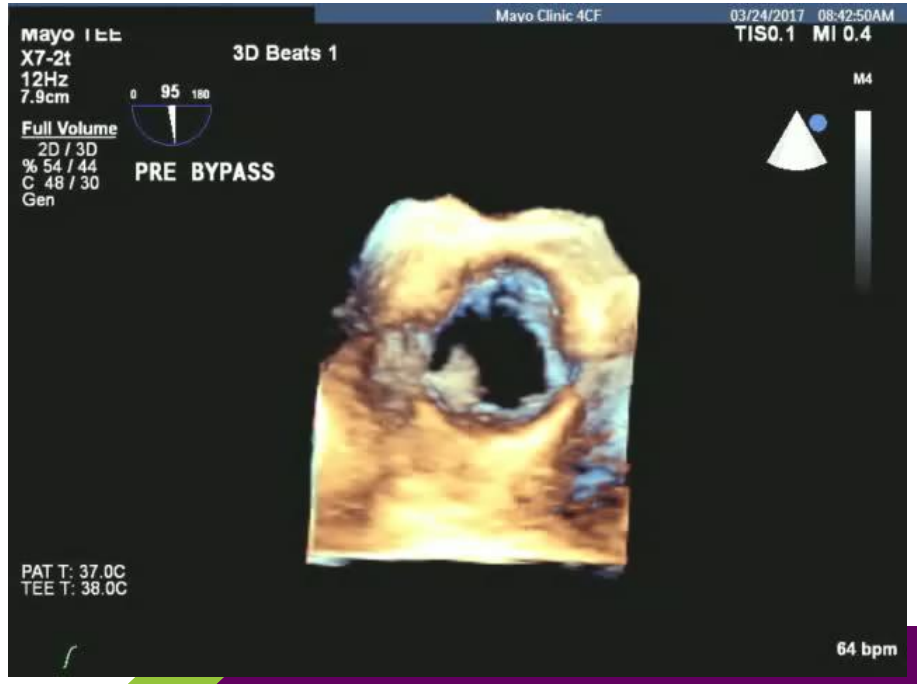
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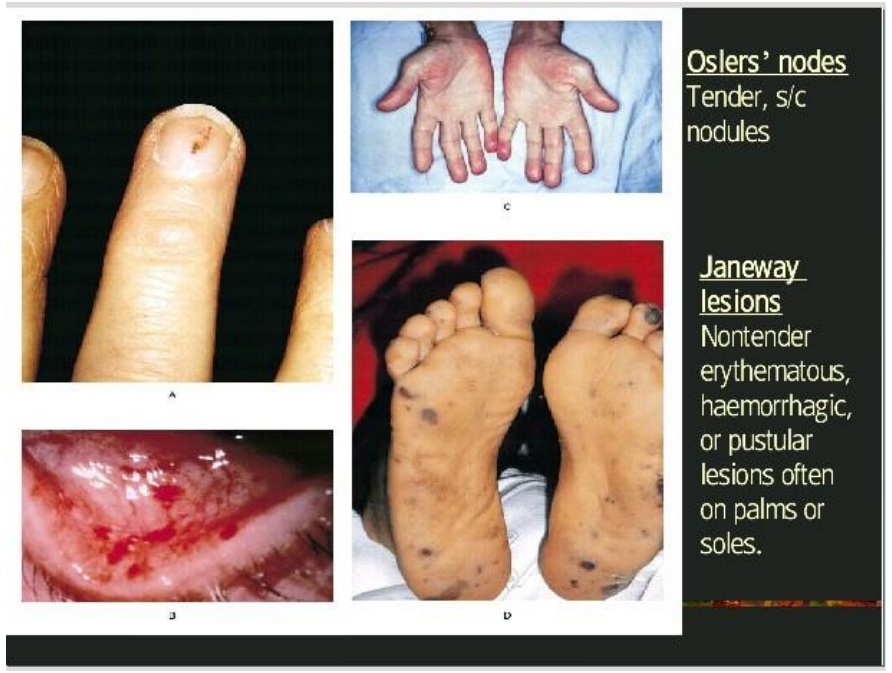
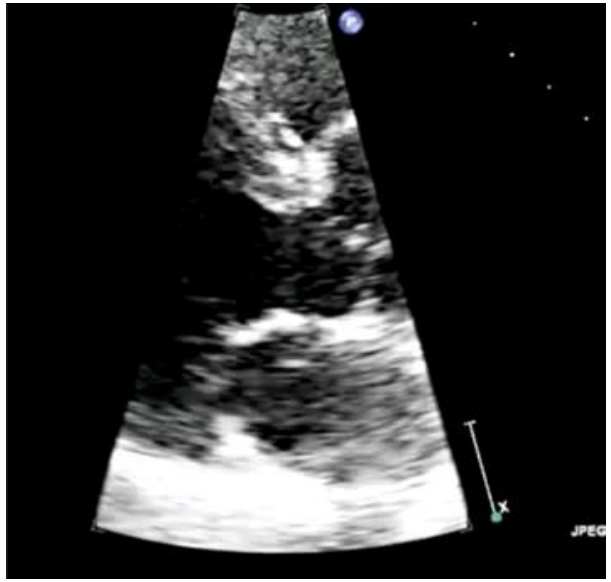
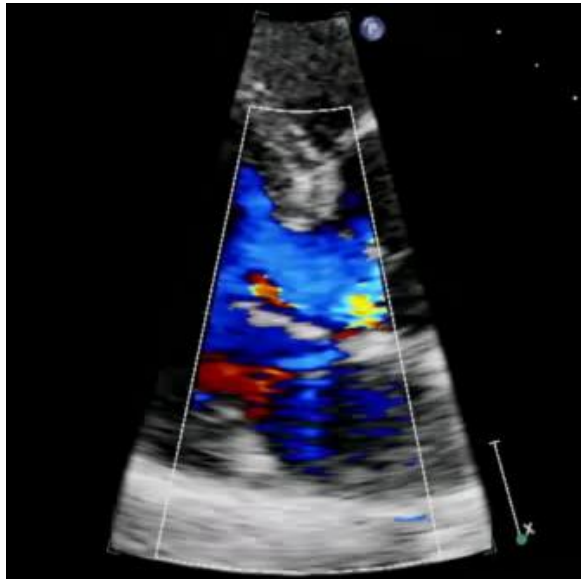
3D Beats 1
Full Volume
2D / 3D
% 54 / 44
C 48 / 30
Gen
PRE BYPASS
PAT T: 37.0C
TEE T: 38.0C
64 bpm

Infective endocarditis

- Attached to LVOT surface for AV IE, attached to LA surface for MV IE (upstream)
- Usually associated with regurgitation
- Present with fever, new murmur, embolic phenomenon, Osler's node, Janeway lesion
- Bld c/st always +ve
- First line with iv antibiotics
- Surgery: Significant regurgitation or obstruction, >1cm size

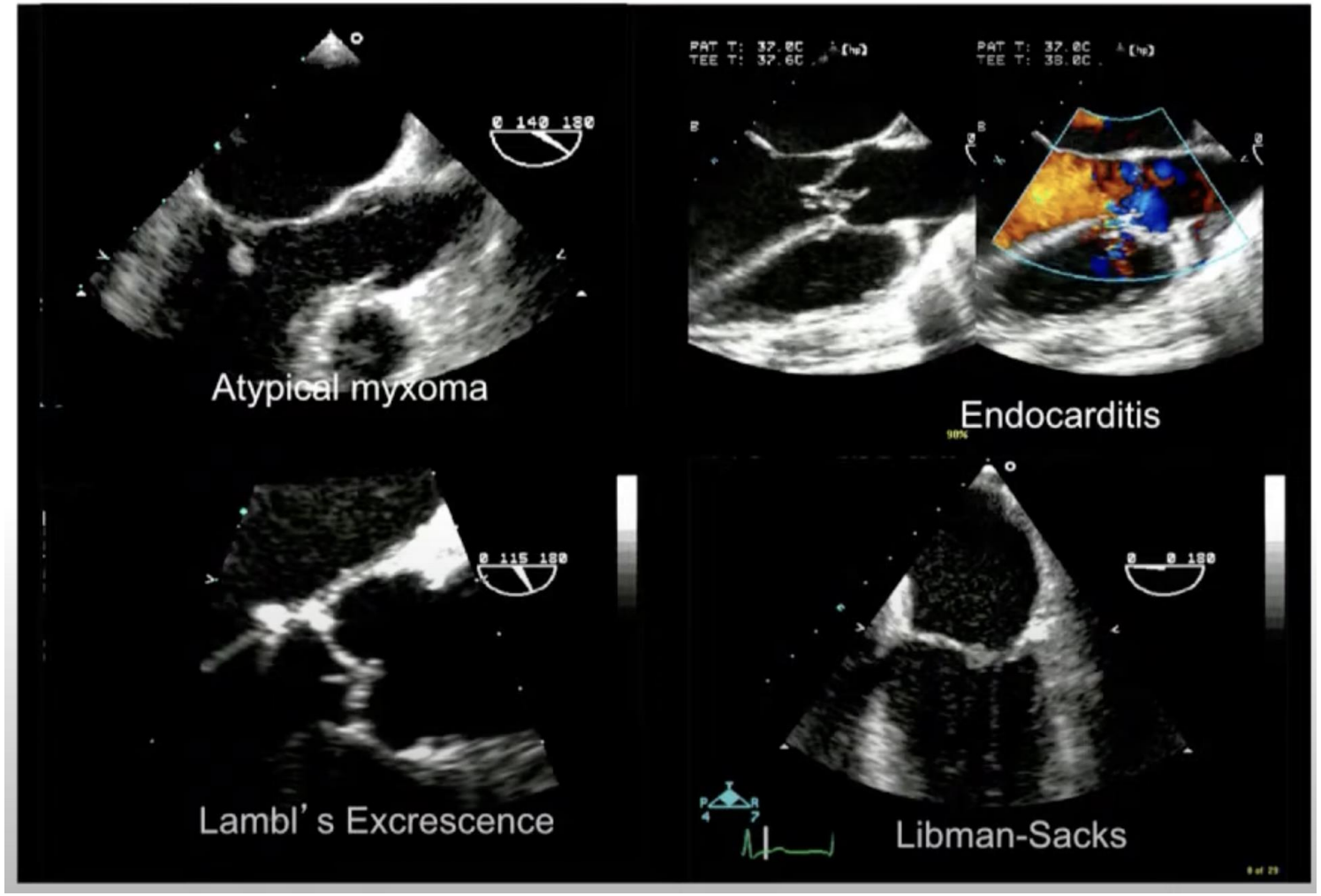






DDX of valvular masses

- Atypical myoxma
- Lambl’s excrescence
- Libman-Sacks endocarditis
- Blood cysts

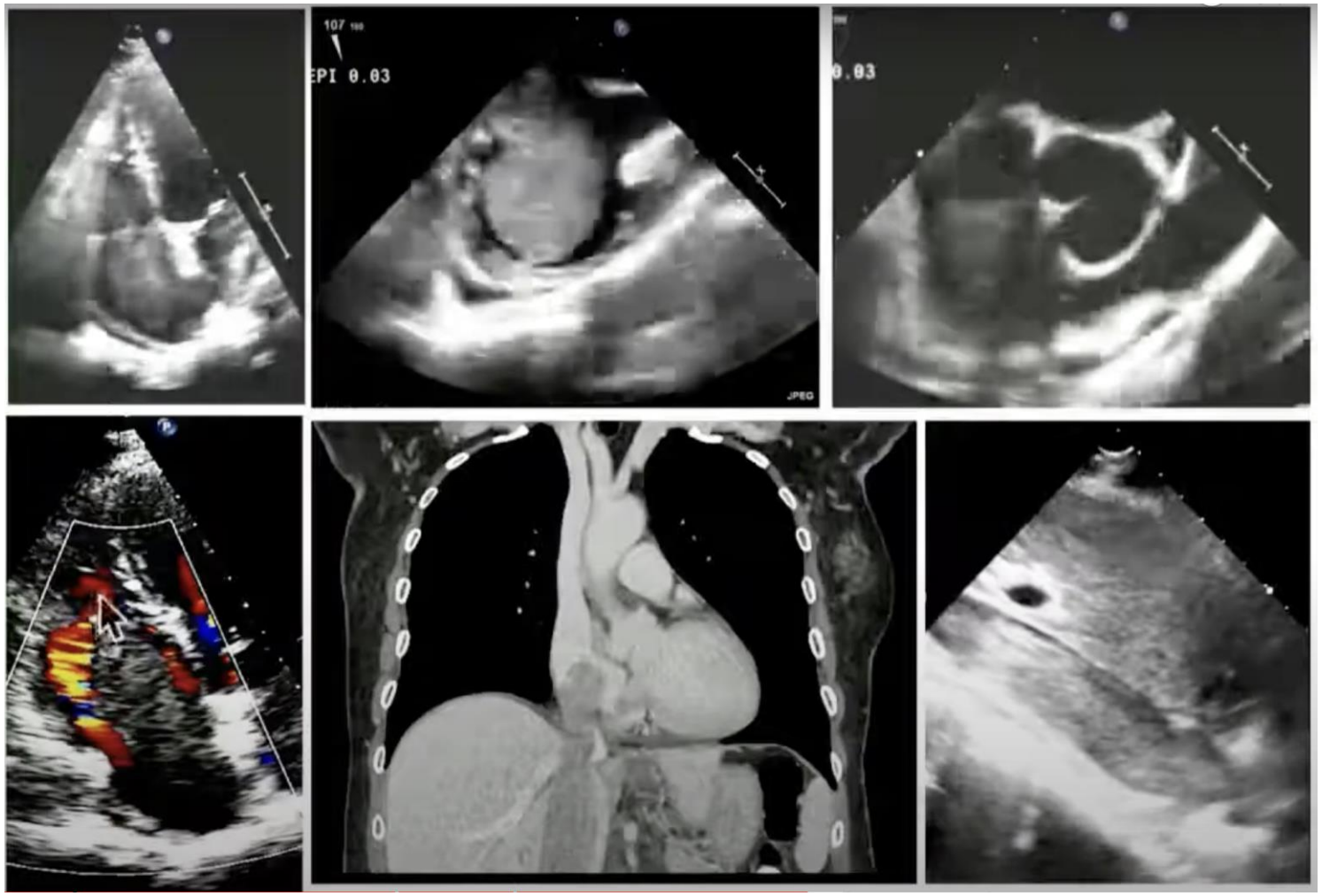


Courtesy of Dr R Lang

IVC and pericardial masses

IVC masses

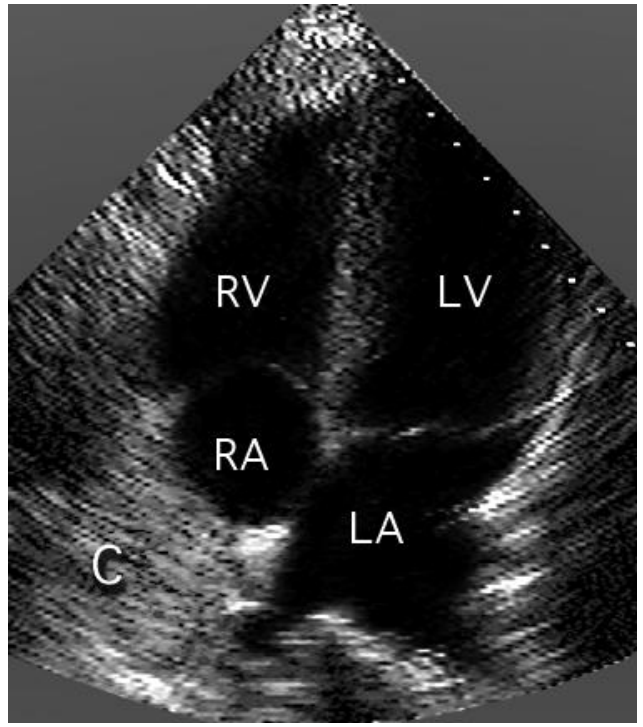
- **Primary IVC tumour**
  - **Leiomyosarcoma**
- Secondary IVC tumour
  - Renal cell carcinoma (RCC)
  - Hepatocellular carcinoma (HCC)
  - Retroperitoneal tumour
  - Adrenal carcinoma

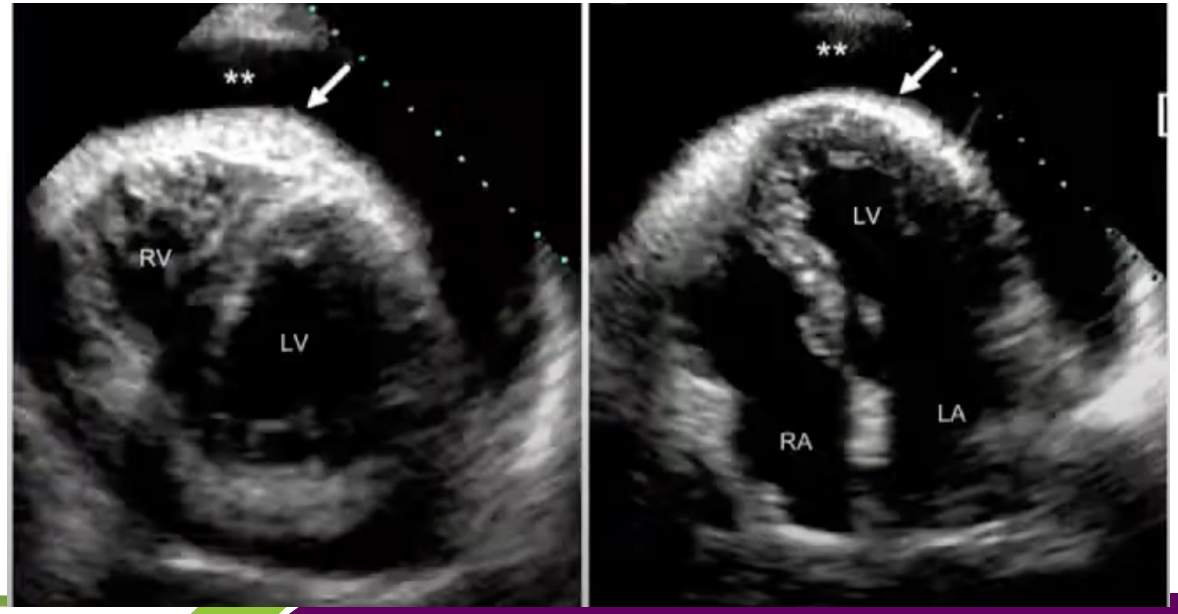


Courtesy of Dr R Lang

Pericardial masses

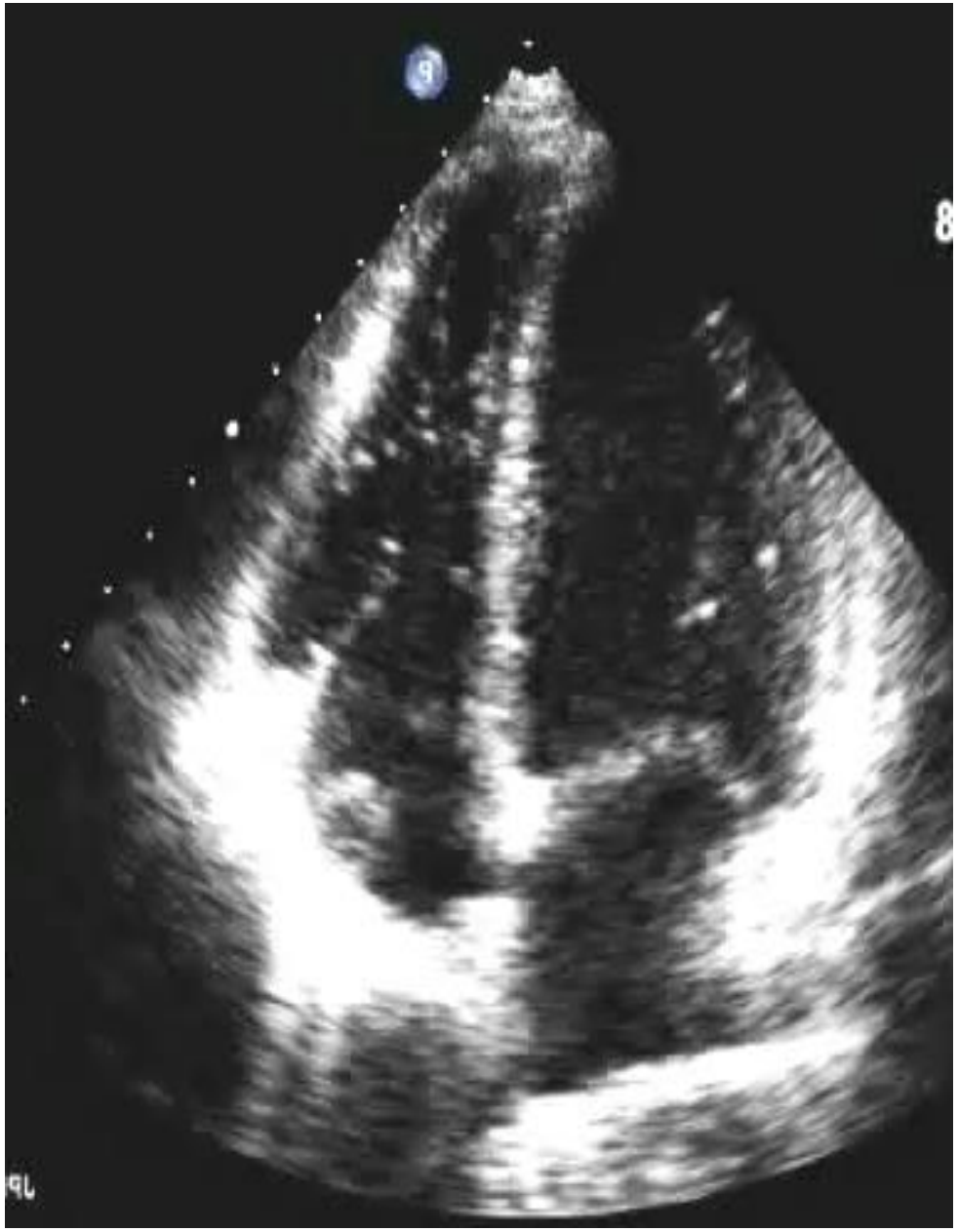
- Benign tumours
  - Pericardial cysts and lipoma
- Malignant tumours
  - Mesothelioma
  - Sarcoma
  - Lymphoma
  - Neuroectodermal tumour





Case 1

- F/18
- Hx of Cushing's syndrome
- Multiple lentigines
- No FHx of cardiac disease



Case 1

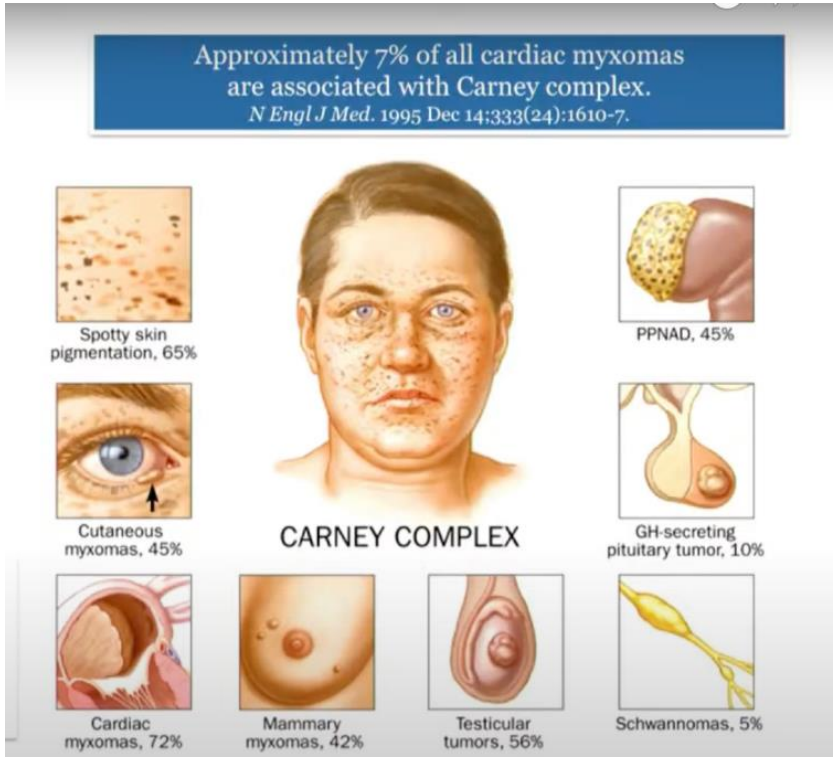
1. Thrombus
2. Myxoma
3. Angiosarcoma
4. Metastatic renal cell cancer

Case 1

1. Thrombus
2. **Myxoma**
3. Angiosarcoma
4. Metastatic renal cell cancer

Atypical RA myxoma

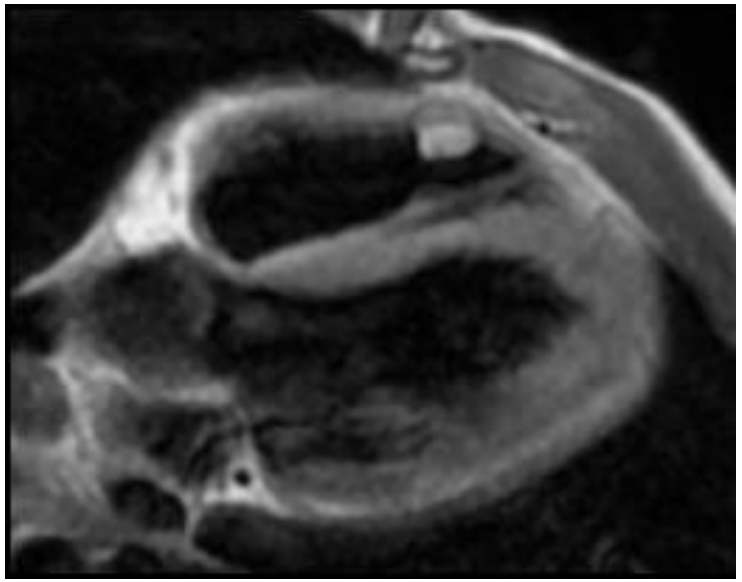
- **Carney complex**
- Myxomas of skin and heart
  - Multiple or recurrent
  - Atypical locations
- Hyperpigmentation of skin (lentigines)
- Endocrine tumors
  - Cushing's syndrome
- Myxomas of thyroid, breast, or testes
- ~70% familial (AD)

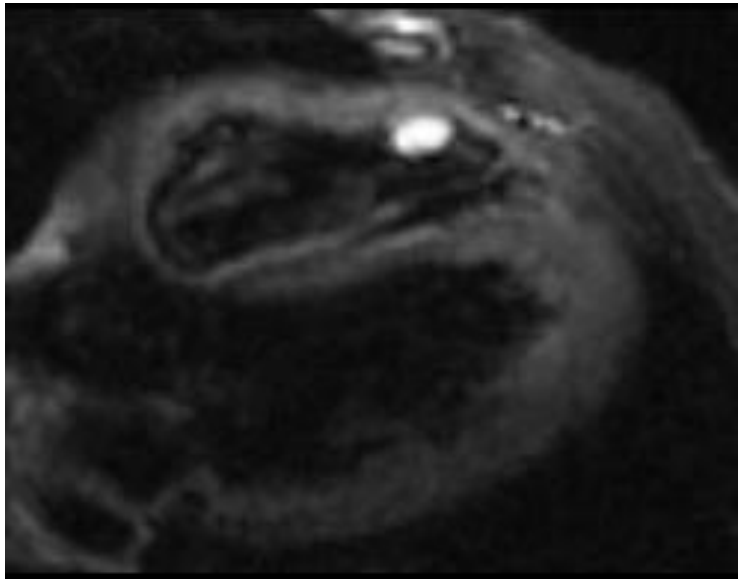


Carney, J. *Medicine.* 1985; 64:270-83

Recurrence of myxoma

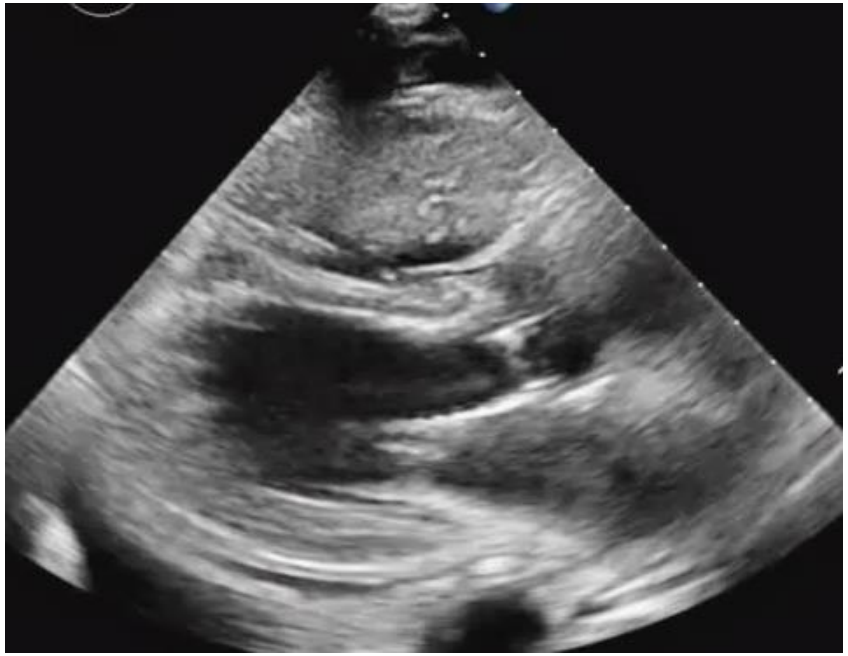
- Atypical site
- Hypo- or isointense to myocardium on T1 images
- Hyperintense on T2 images
  - High extracellular water content
- Heterogeneous enhancement with gadolinium





Case 2

- F/74
- HT, hx of ischemic stroke
- c/o chest pain and SOBOE, TnI 22.1, LDH 1033
- ECG: SR, no ischemic changes
- CT small PE, noted incidental finding in RV mass, thus Echo was done
- RV free wall mass measured 6.4x3.6cm



Case 2

1. Metastatic cancer
2. Thrombus
3. Angiosarcoma
4. Lymphoma

Case 2

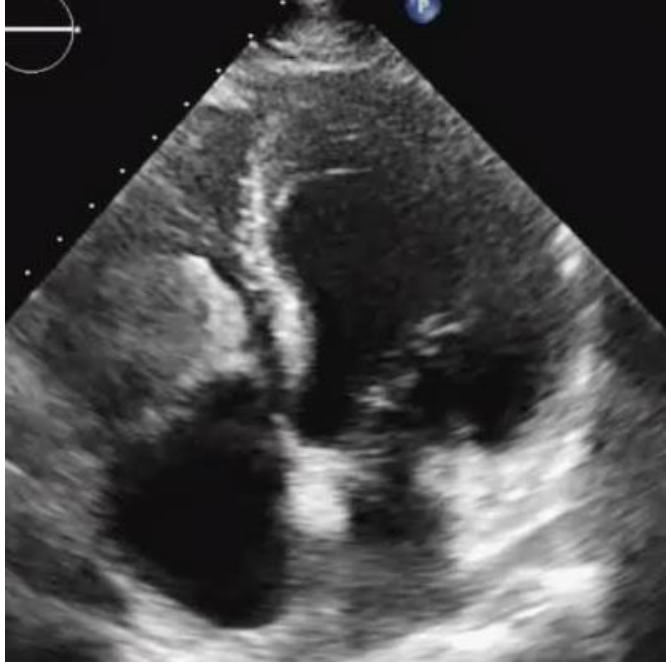
1. Metastatic cancer
2. Thrombus
3. Angiosarcoma
4. **Lymphoma**

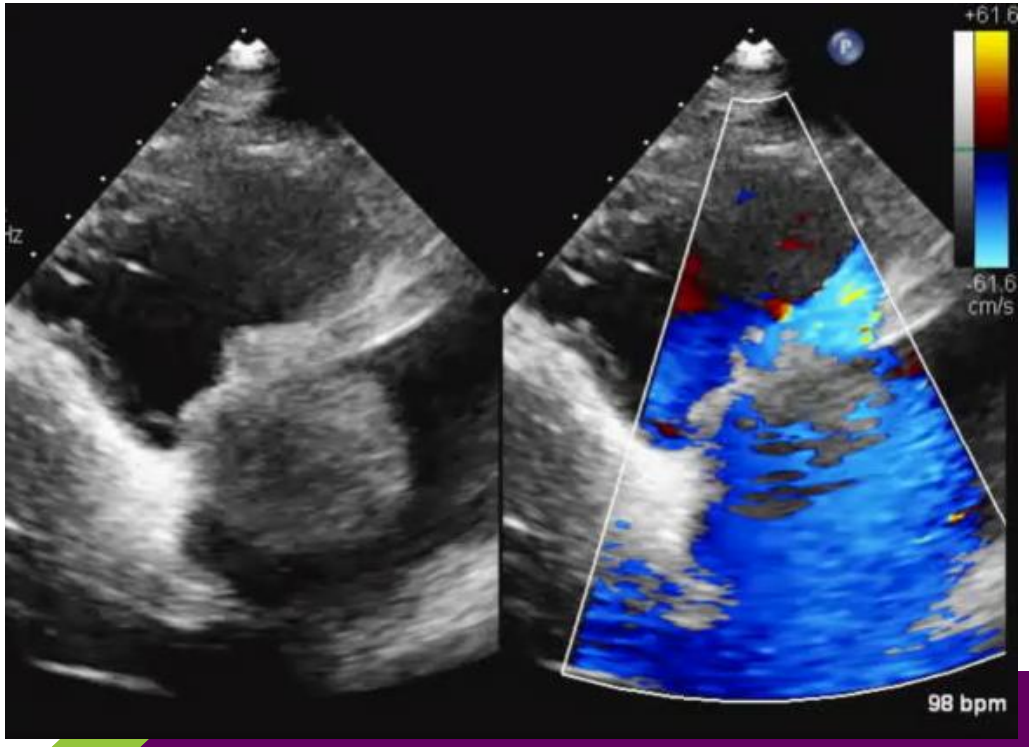
High grade B cell lymphoma

- CTS: inoperable due to huge RV mass
- BME: Small lymphocytic aggregates only
- Cardiac MR: highly suspicious of malignancy (ddx: lymphoma, sarcoma), extensive RV thrombus is unlikely
- RV tissue biopsy done by bioptome forcep: DLBCL
- Given R-CHOP with initial improvement
- Complicated with large abdominal haematoma (low plt) , AKI and finally succumbed

Case 3

- M/46
- Poorly controlled DM
- Hx of melioidosis (Rt thigh abscess / bil knee septic arthritis)
- pTB completed HRZE
- Presented with fever, bld c/st – ve for bacteria





Case 3

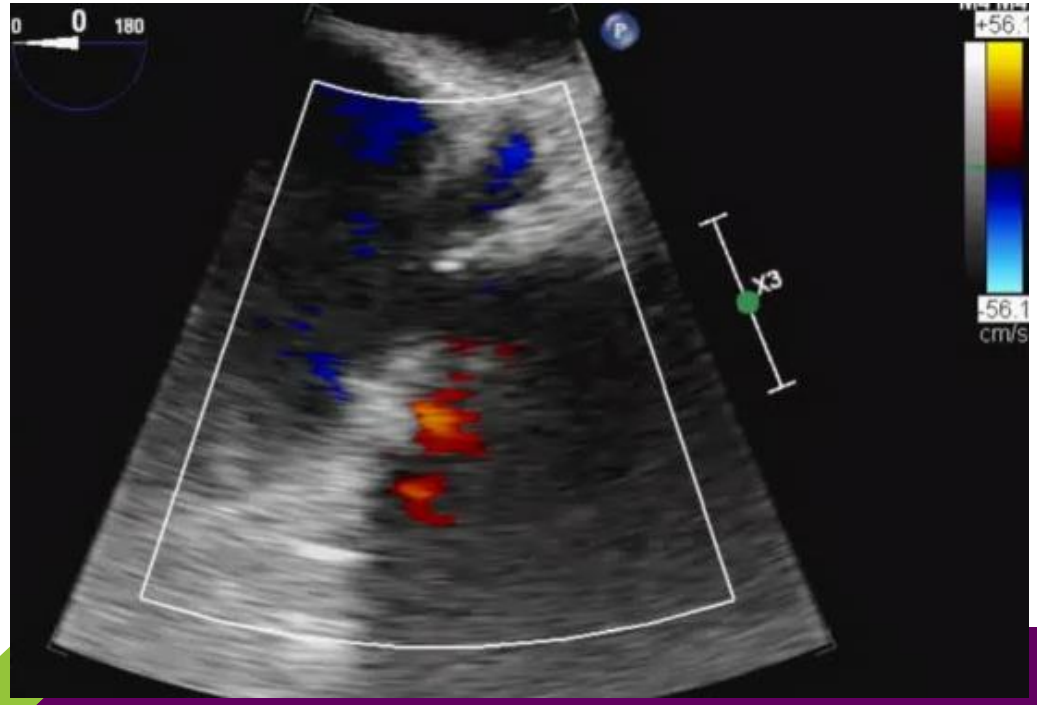
1. Atypical myxoma
2. Infective endocarditis
3. Atypical papillary fibroelastoma
4. Angiosarcoma

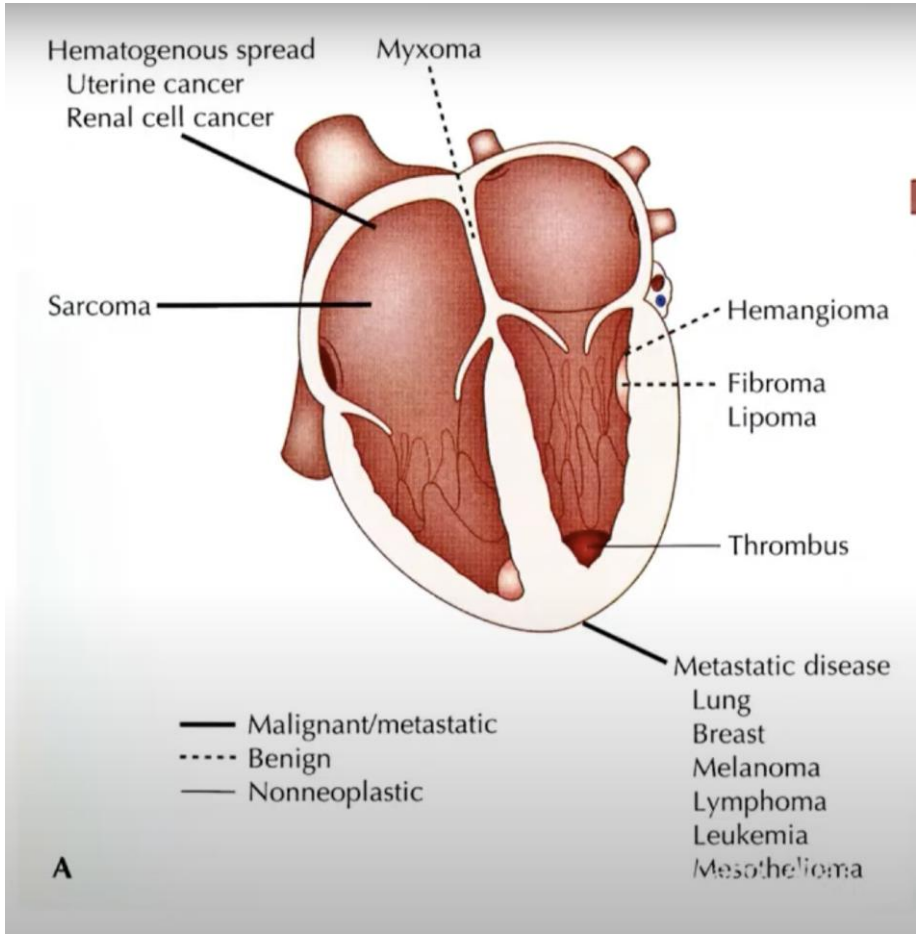
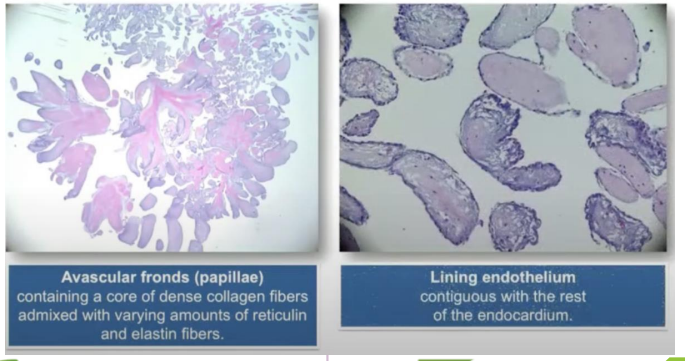
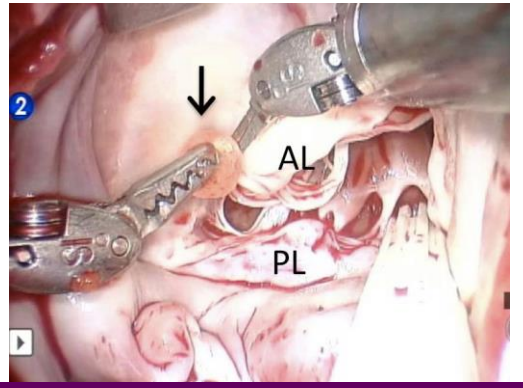
Case 3

1. Atypical myxoma
2. **Infective endocarditis**
3. Atypical papillary fibroelastoma
4. Angiosarcoma

Fungal IE due to candidiasis

- Bld c/st: candida tropicalis
- History of disseminated candidiasis with acute cholecystitis
- Given 6 weeks of iv Micafugin followed by oral fluconazole
- Aggressive DM control with insulin
- Bioprosthetic TVR
  - Implanted CRT-P due to complete heart block and fair EF
- 3yrs later, suspected bioprosthetic IE with bioprosthetic TE (mean gradient 10mmHg), bld c/st: klebsiella, CTS: not for redo TVR, sudden arrest -> failed resuscitation



Summary

- Location of cardiac tumour is **most** important
- Primary cardiac tumour is rare and 80% of them belong to myxoma
- Pay particular attention to clinical history
- Cardiac MRI, histological biopsy will help to establish the diagnosis
- Surgical intervention is indicated for atrial myxoma and high risk PFE