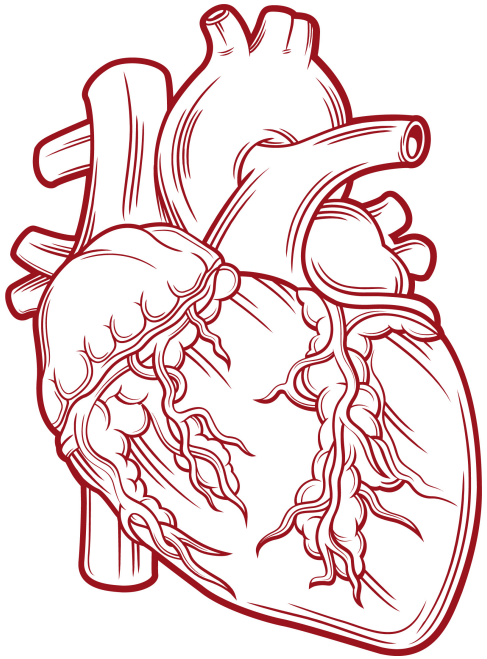
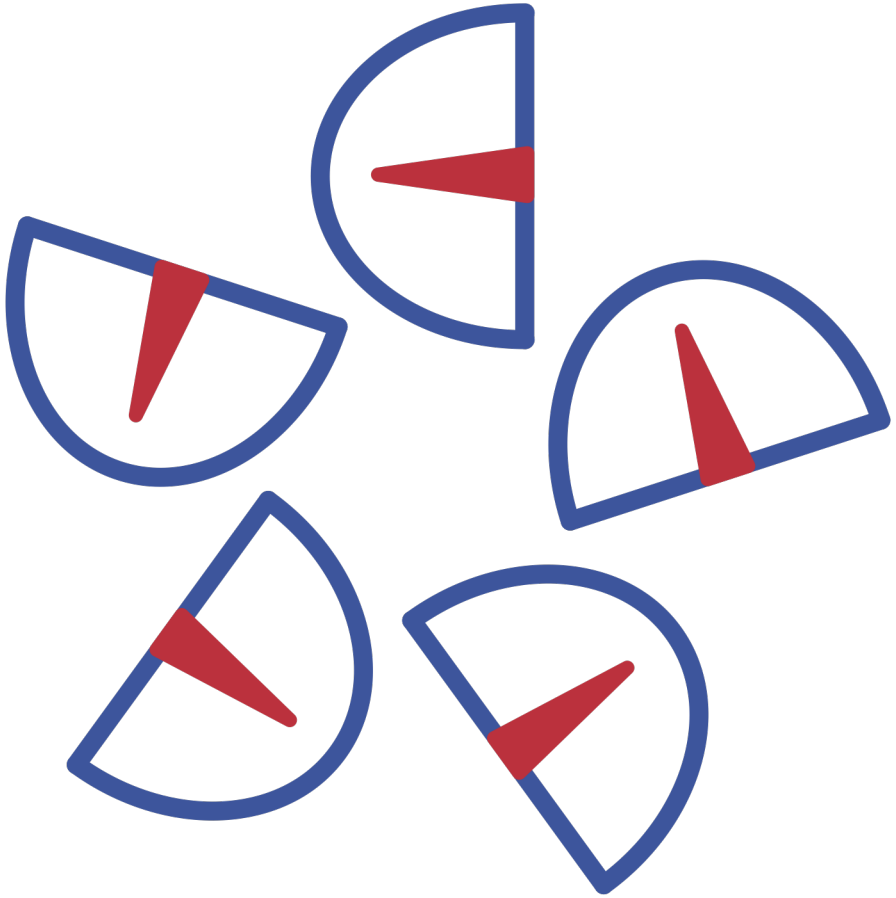
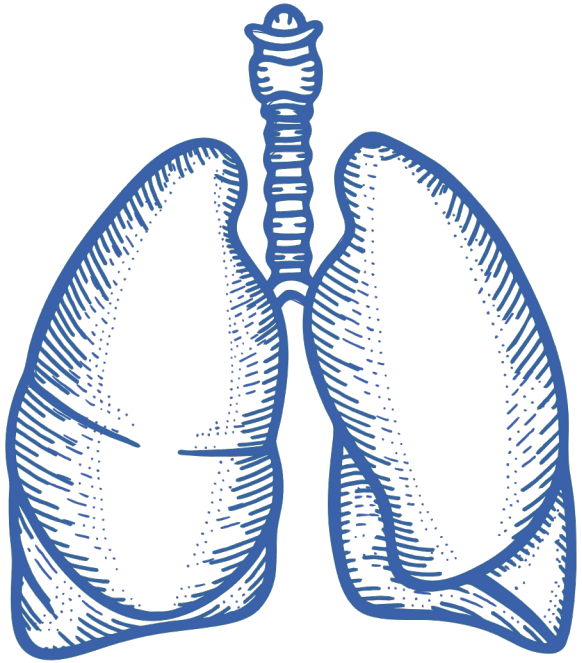






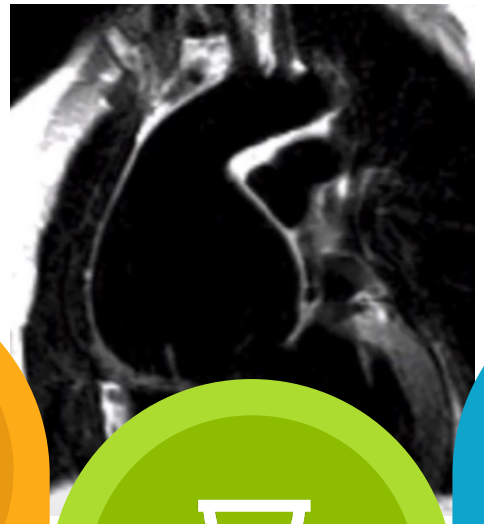
CLAP Snaps

5 Key Messages
Aortic Valve Presentations
Thursday 24th June 2021

www.CardiothoracicAnaesthesia.com

Anatomy and Pathophysiology Of the Aortic Valve and Root

Miss Katie O'Sullivan



What is the aortic root?

The portion of the thoracic aorta extending from the aortic valve annulus to the sinotubular junction

Function of the root

To transmit large volumes of blood with minimal obstruction to laminar flow while maximising coronary blood flow.

AR

Unoperated AR pts with angina due to regurgitation have 100% mortality at 4 years.

Marfan's

60-80% of Marfan's patients will go on to develop aortic root aneurysm with characteristic pear shape on imaging.

AR vs AS

AS pts more likely to die in first few years after diagnosis but then their hearts compensate. AR pts do better initially but then deteriorate later after decompensation occurs.

TOE of the AV and Root

Dr Christos Chamos

1

No such thing as an annulus?

There is no anatomically- or histologically-defined aortic annulus.

The annulus is a level of the aortic root that is measured on imaging.

2

Anatomy vs Physiology

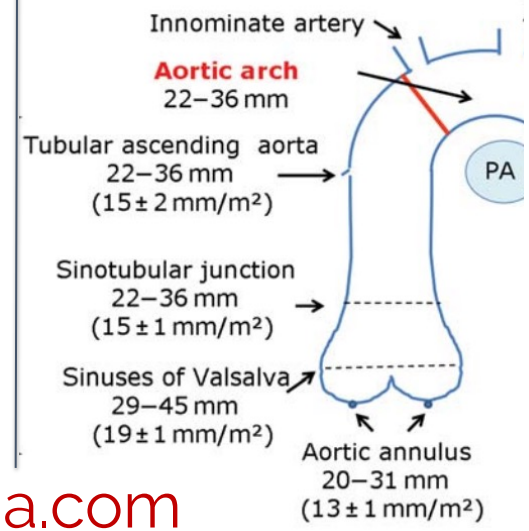
Mid-oesophageal AV LAX and SAX views best for imaging AV and root anatomy

Transgastric LAX and deep transgastric views best for lining up Doppler beams for assessment of flow

3

Measuring the Root

May need to pull the probe back slightly from the ME LAX view to optimise the root image



4

TOE under GA

Altered loading conditions under GA with IPPV can lead to significant underestimations of velocities and gradients in AS compared to TTE measurements in awake patients.

Consider using the dimensionless index:
DI = LVOT VTI/AV VTI

DI < 0.25 = severe AS

5

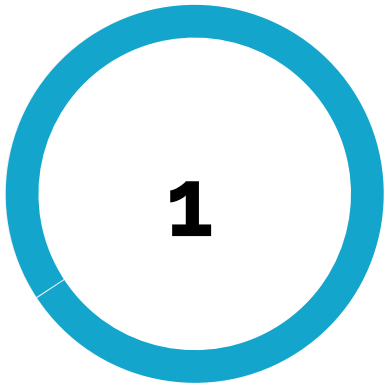
3D or not 3D

Considering 3D ultrasound to aid with measurements of the aortic root.

A multiplanar reconstruction gives multiple slices allowing the point of leaflet attachment to be precisely identified and an accurate annular measurement taken.

The Echocardiography of Normal and Abnormal Prosthetic Heart Valves

Dr Guy Lloyd



1. Is the valve leaking? (most prosthetic valves leak)

2. Is the valve obstructed (all porsthetic valves obstruct

3. Is the valve infected?

Three Questions to Answer

Paravalvular leak >10% of circumeference of sewing ring

TAVI - jet length >2/3 of AMVL

Severe AR in prosthetic valves

- <2-3cm
- Low velocity
- Convergent or central
- Intravalvular
- Recognised pattern

'Normal' Regurgitation

Look carefully at leaflet morphology and motion.

"Not right is important!"

Not right = sign of impending failure (if the valve hasnt already failed)

Look Closely

Examine the sewing ring

Examine leaflet motion and morphology

Interrogate forward and regurgitant flow with Doppler

Examine obstructiveness

Be Methodical

Structural Heart Intervention – TAVI & Beyond

Dr Michael Mullen

01 TAVI

TAVI valves have developed vastly since their introduction with smaller delivery systems, improved paravaluvular leak, low mortality, short length of stay in hospital (~2 days) and most procedures performed under LA only

02 Transcaval Approach

For patients with difficult access, a wire is passed from the IVC into the aorta! the supracaval pressure of the retroperitoneal space encourages aortocaval blood flow of any haemorrhage following plugging of the aortic puncture site.

03 Valve-in-Valve

When a TAVI valve is expanded within an existing biprosthetic valve, the old leaflets are pushed up to form a tube of tissue which can occlude the coronary ostia.

04 Transcatheter Mitral

As well as the mitraclip, techniques for transcatheter mitral replacement, ring augmentation and neochordae implantation are under development

05 Tricuspid Too!

Tricuspid valves can be repaired or replaced using new technologies – transcatheter TVR can be orthotopic or heterotopic with the valve placed higher in the atria or even in the IVC to protect the liver from severe TR.

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Choice of Prosthetic Heart Valve

Mr Martin Yates

1

tAVR > mMAVR

Above 70y, 98% of UK patients receive a bioprosthetic valve.

Aged 60-70, 81% of patients receive a bioprosthesis.

Even below 60y, 40% of UK patients have a bioprosthetic valve with the remaining 60% getting a mechanical valve.

2

Bleeding and Re-Operation

Lifetime risk of re-do with mAVR is much lower than with bioprosthetic but not zero.

Bleeding risk in mAVR due to anticoagulant rises steadily with age at which the valve is implanted.

3

Choice of Valve

Informed Patient choice
- Age
- Warfarin
- Reintervention risk

Mechanical
- Effective orifice area
- Annulus position
- Target INR

Bioprosthetic
- Effective orifice area
- Valve durability
- Planning for future valve-in-valve TAVI

4

Externally- or internally-mounted bioprosthetic leaflets

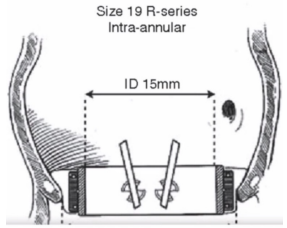
Magna-Ease (int)
- Smaller EOA
+ Better durability
+Safer for ViV TAVI

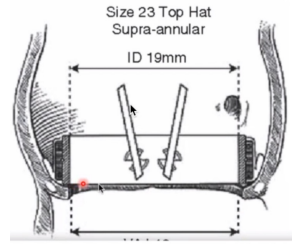
Trifecta (ext)
+ Greater EOA
-/+ Older examples had some durability issues, better now
- Higher risk of coronary obstruction at ViV TAVI

5

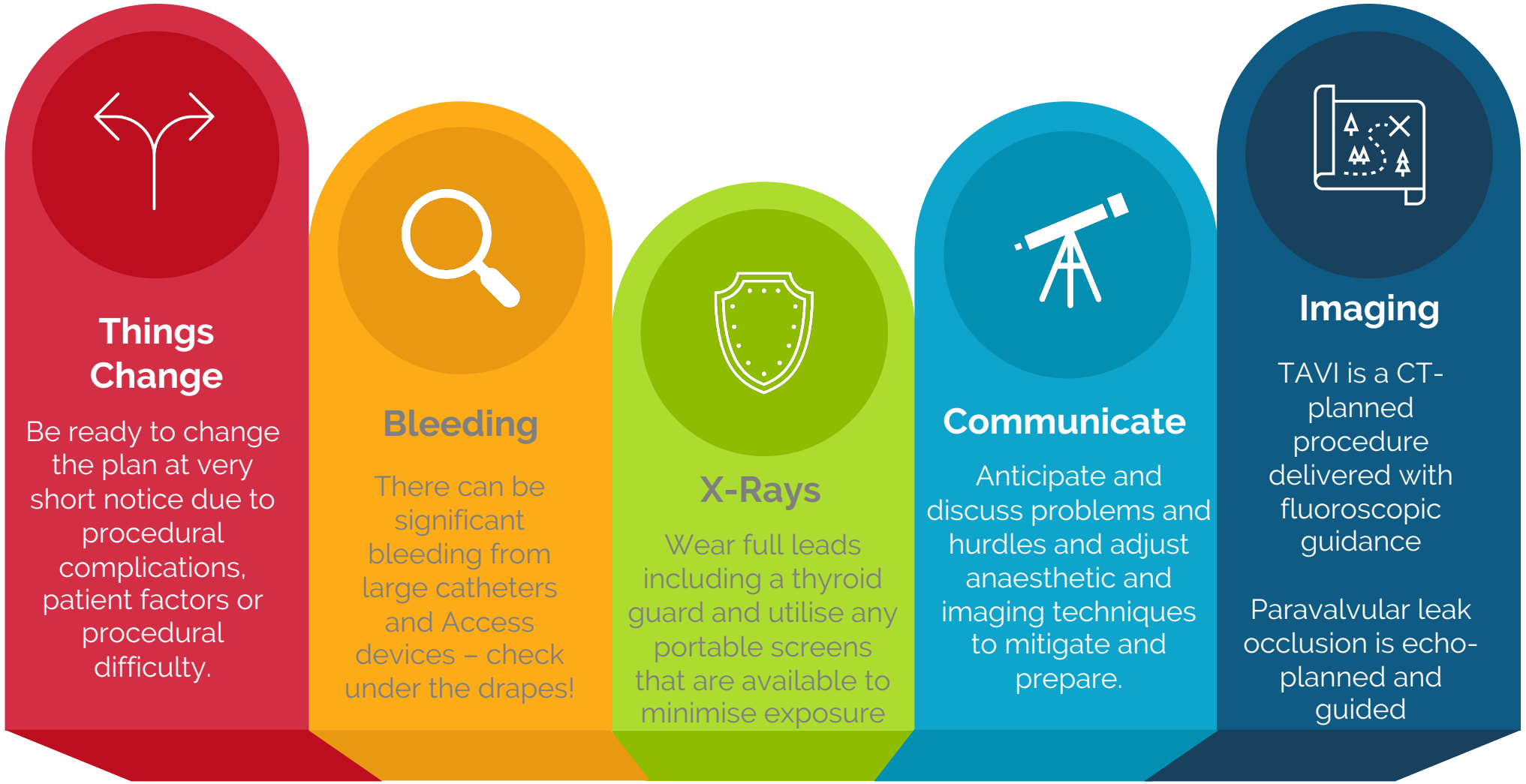
Annular or Supra-Annular

A Supra-annular implantation allows for a greater EOA



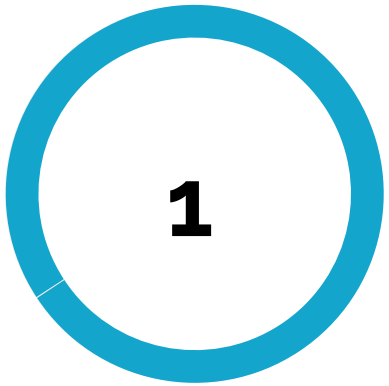


Anaesthesia and TOE for TAVI
Dr Andrew Smith



Aortic Root Surgery

Mr John Yap



The David 4 procedure involves occluding the coronary sinuses with the root graft to reinforce the aortic annulus with subsequent reimplantation of coronary buttons. This helps to maintain the integrity of the AV.

Valve-Sparing Root Replacement

Dissection with SoV involvement

-Or-

Aneurysmal root
>55mm (gen pop)
>50mm Marfan's
>45mm high risk Marfan's (severe HTN, AR, direct FHx of dissection)

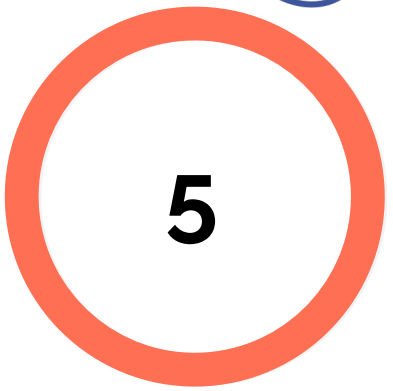
Aortic Root Replacement

An aortic root or ascending aorta should be replaced at the time of other cardiac surgery if the root diameter is 45mm or greater

Concomitant ARR

Replacement of a diseased aortic valve with the patient's own pulmonary valve & subsequent PV allograft is no longer recommended in adults even in the setting of endocarditis.

Ross Procedure



Twisting of reimplanted coronary arteries can be a cause of post-op morbidity and mortality

Beware: twisting and kinking may not manifest until the chest is closed and filling pressures normalise.

Coronary buttons