CVI SYMPOSIUM 2012

VALVULAR HEART DISEASE

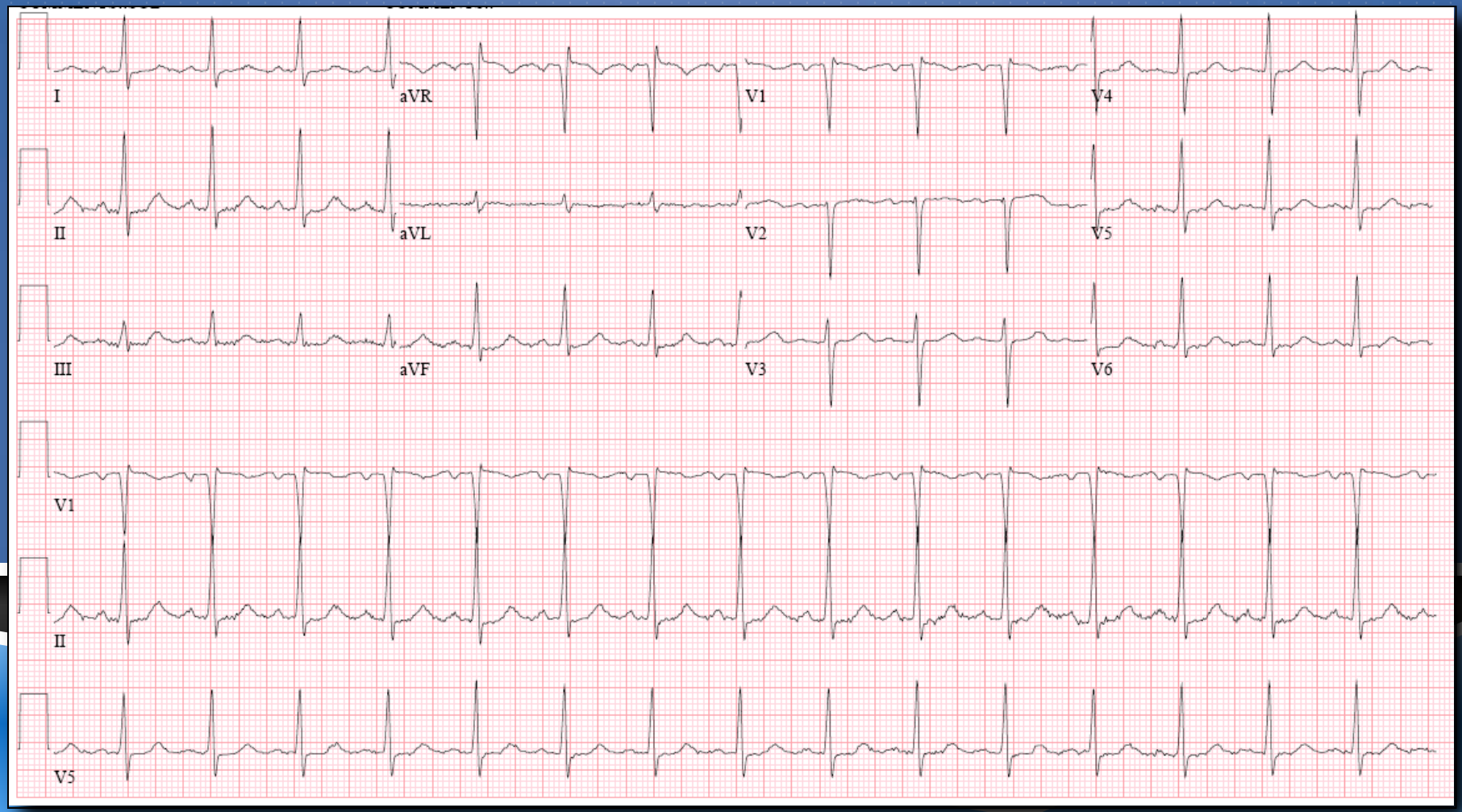
AORTIC VALVE STENOSIS
TAVR PROCEDURE

Luis F. Tami, MD
Cardiac Cath Lab Director
Memorial Regional Hospital

86 yr old CABG 1995. LIMA to LAD and SVG to OM. Presented CHF in February 2011.

Cath'd: Severe AS. Stabilized well on lasix.

EKG in Feb shown.



PMHX

- CABG 1995: Mt. Sinai Hospital in Miami
- Diabetes type 2
- Hypertension and dyslipidemia
- Anemia, iron def. Hg 9-11
- Bladder tumor, urology following
- PVD and claudication
- CKD stage III: Creat 1.4-1.7

MEDS:

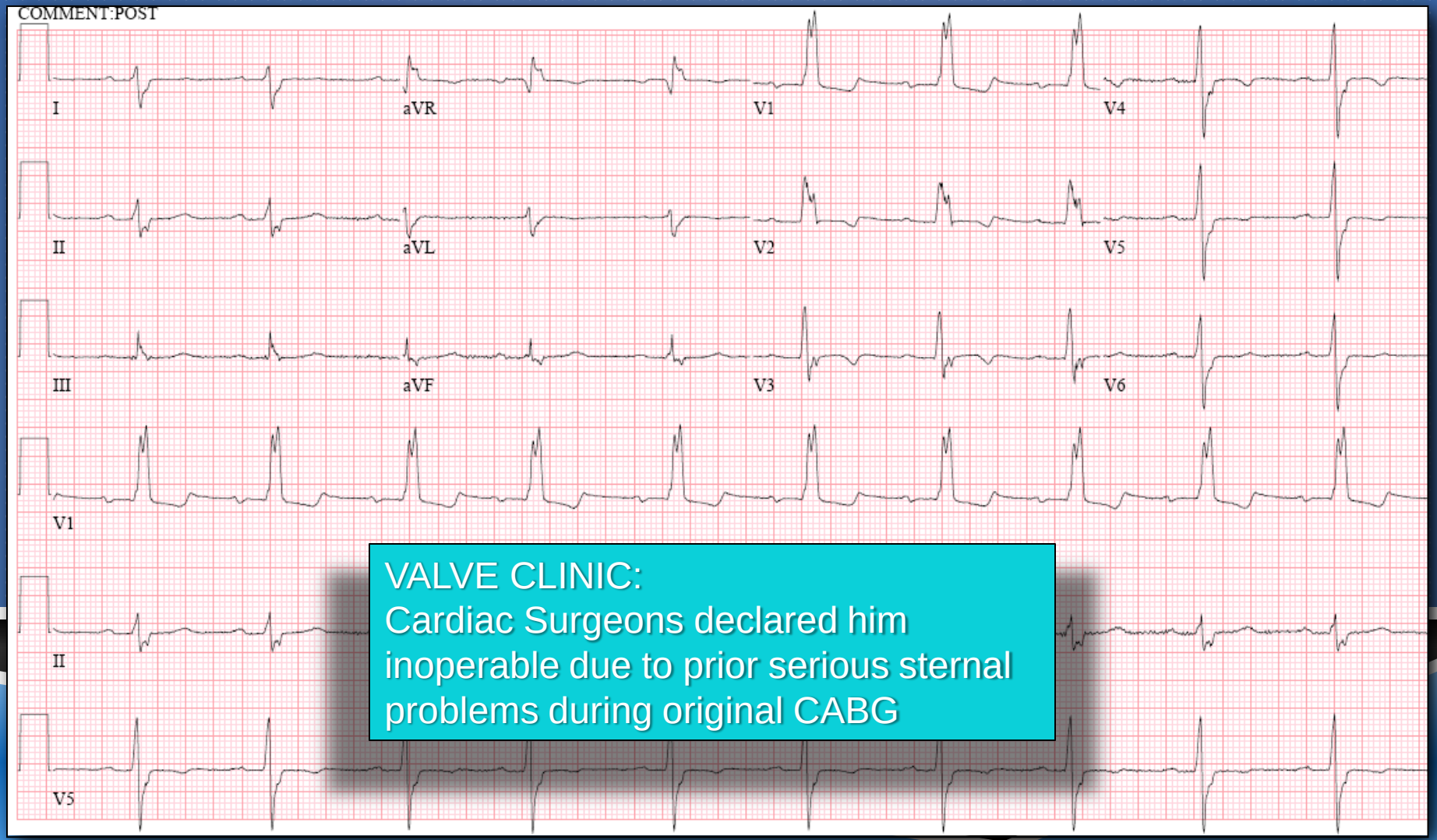
- Lasix 20 mg/d
- Crestor 10 mg/d
- ASA and Plavix
- Nifediac 60 mg/d
- Losartan 1oo mg/d
- Januvia 25 mg/d
- Metoprolol succinate 50 mg/d

ECHO FEB 2011

- EF 55%
- MP gradient: 80 mmHg
- Mean gradient: 50 mmHg
- Mild AR and MR

- LVOT diameter: 20 mm
- LVOT peak velocity: 110 cm/sec
- AV velocity: 448 cm/s
- AVA: 0.78 cm2

OK for a few months
Developed increasing SOB in Sept 2011
Referred to Memorial Valve Clinic for AVR/TAVR.



VALVE CLINIC:
Cardiac Surgeons declared him inoperable due to prior serious sternal problems during original CABG

MEMORIAL VALVE CLINIC

HEART TEAM

CANDIDATE FOR AORTIC VALVE REPLACEMENT

SURGICAL CANDIDATE

NOT SURGICAL CANDIDATE

PALIATIVE CARE

STANDARD AVR

TRANSCATHETER AVR OPTION

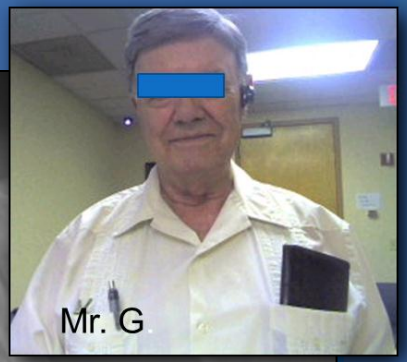
TEE: Measure VALVE SIZE
ABDOM CTA: ACCESS
CARDIAC CT IF POSSIBLE

ACCESS OK

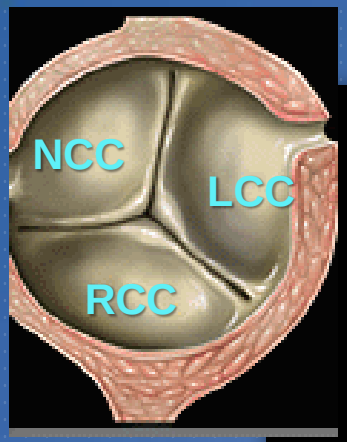
TAVR

NO ACCESS

PALIATIVE CARE



September 2011



LA

NCC

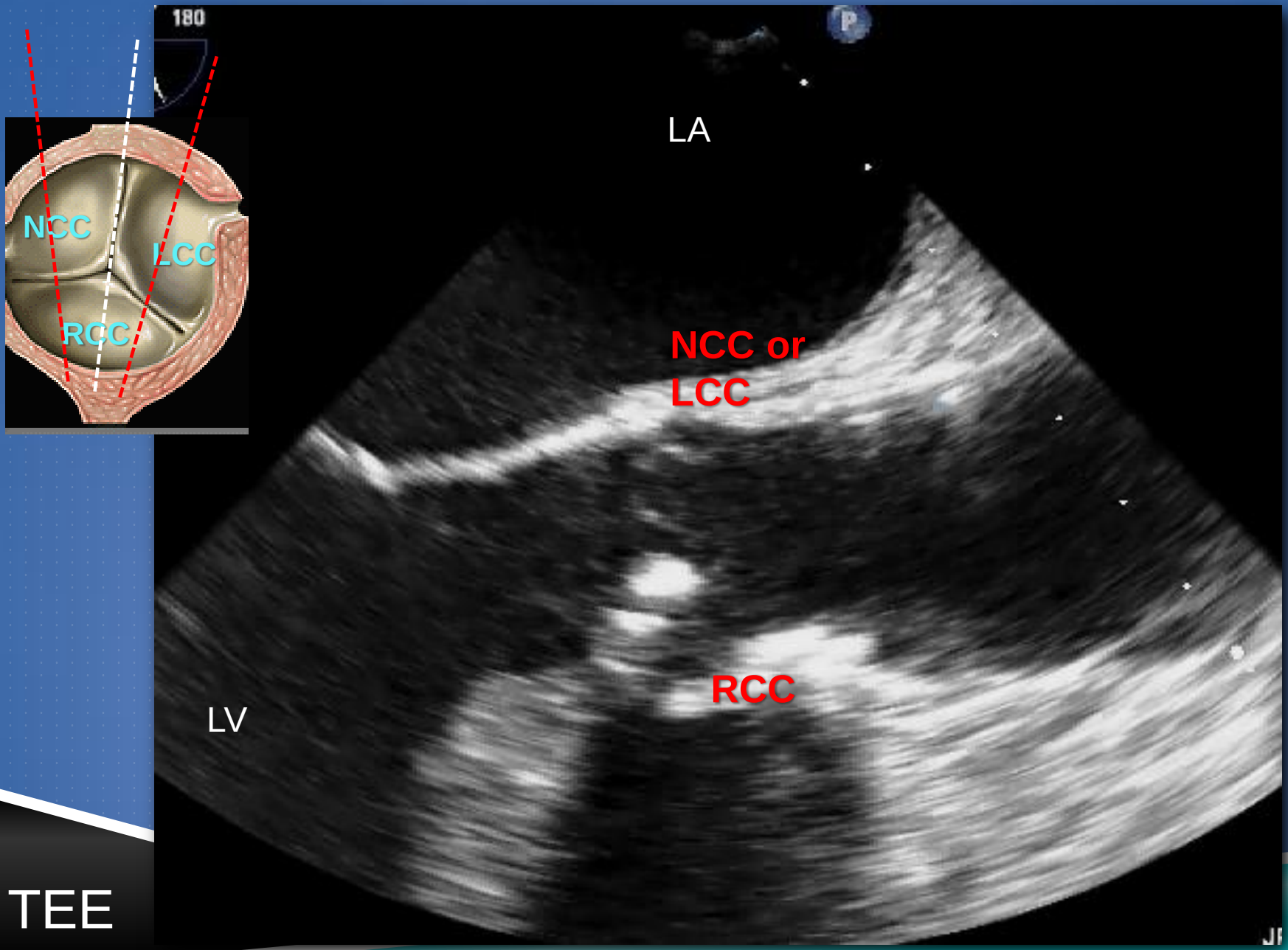
RA

LCC

RCC

RVOT

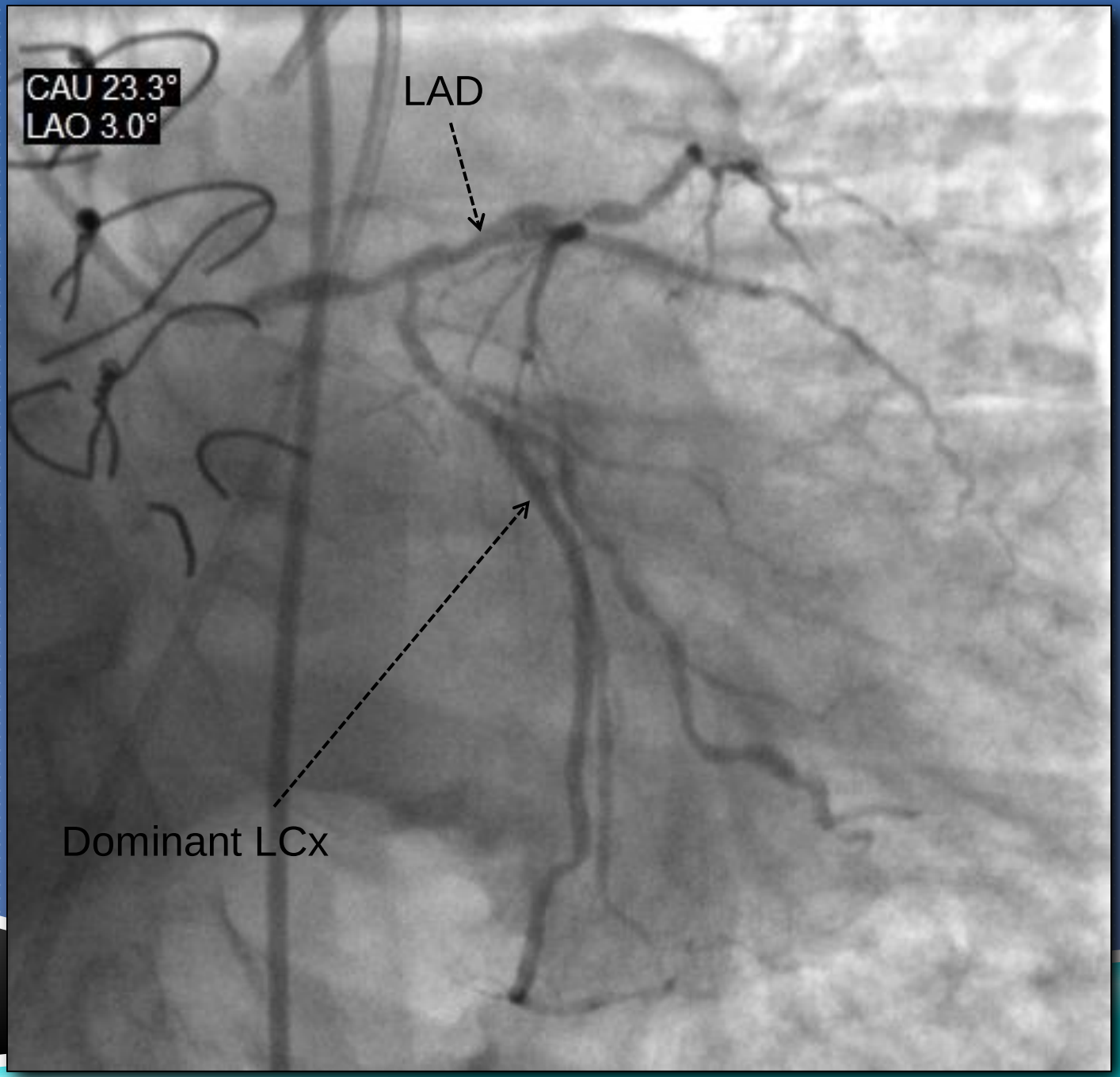
TEE

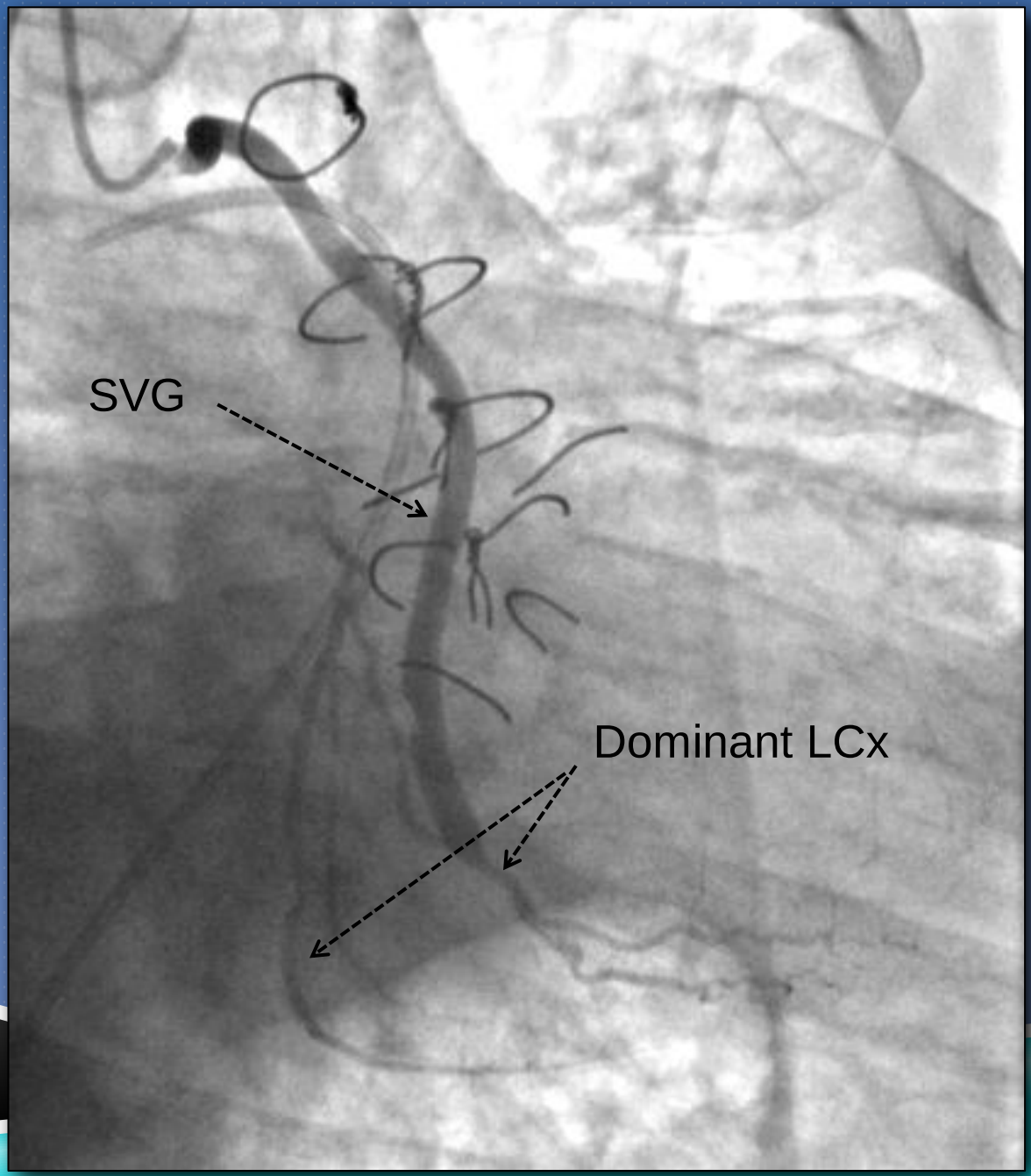


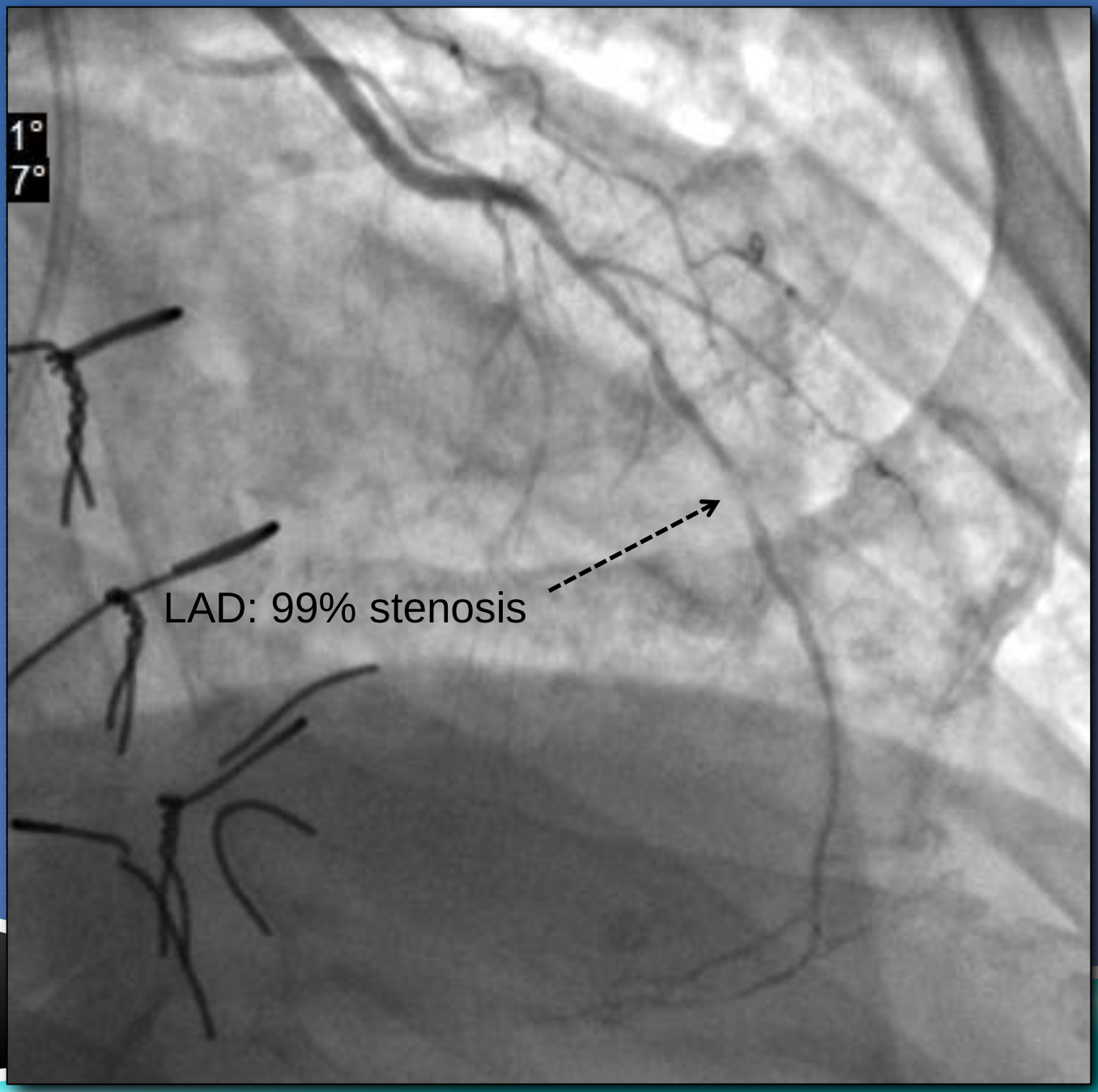
TEE

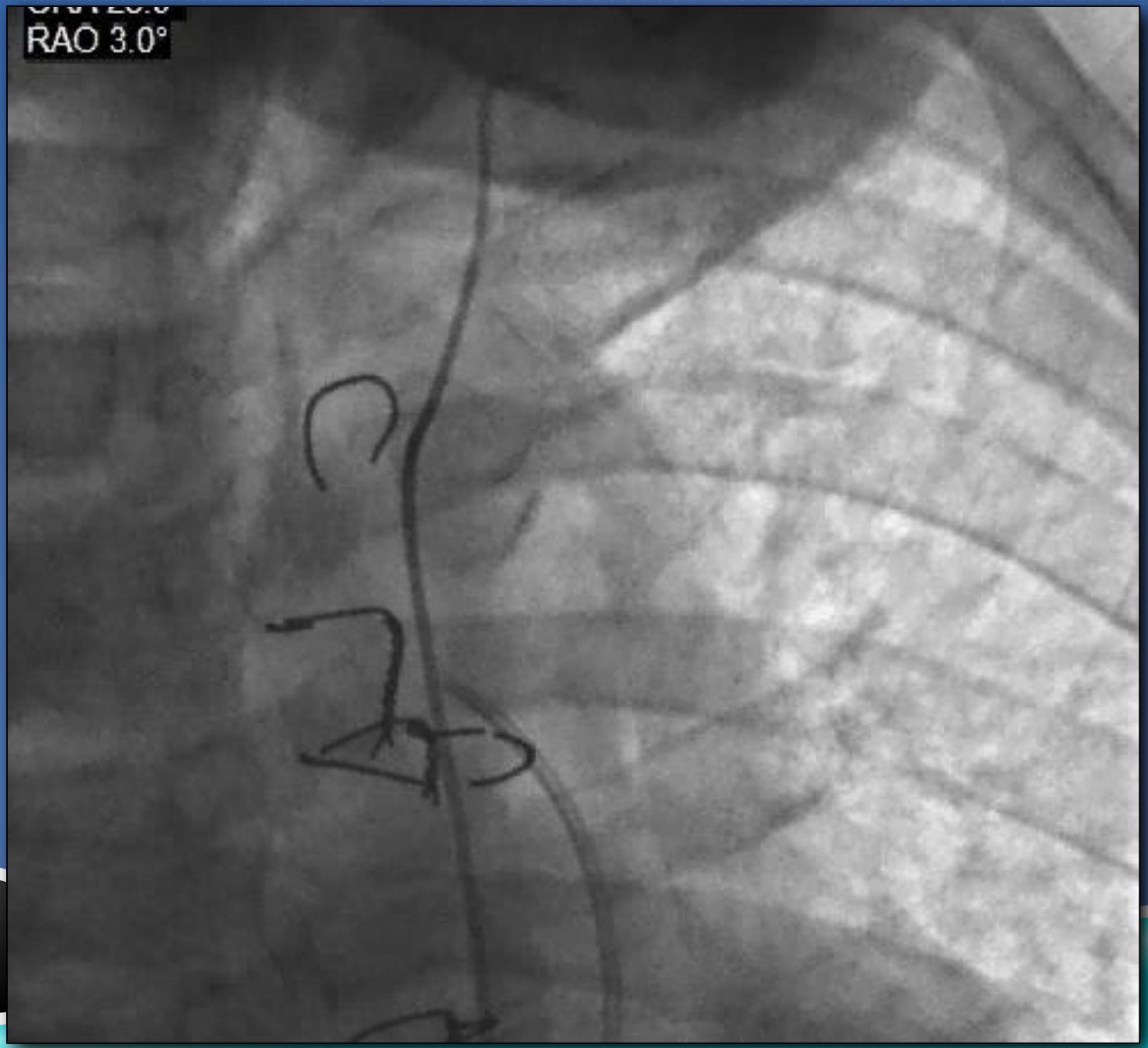
CARDIAC CATH

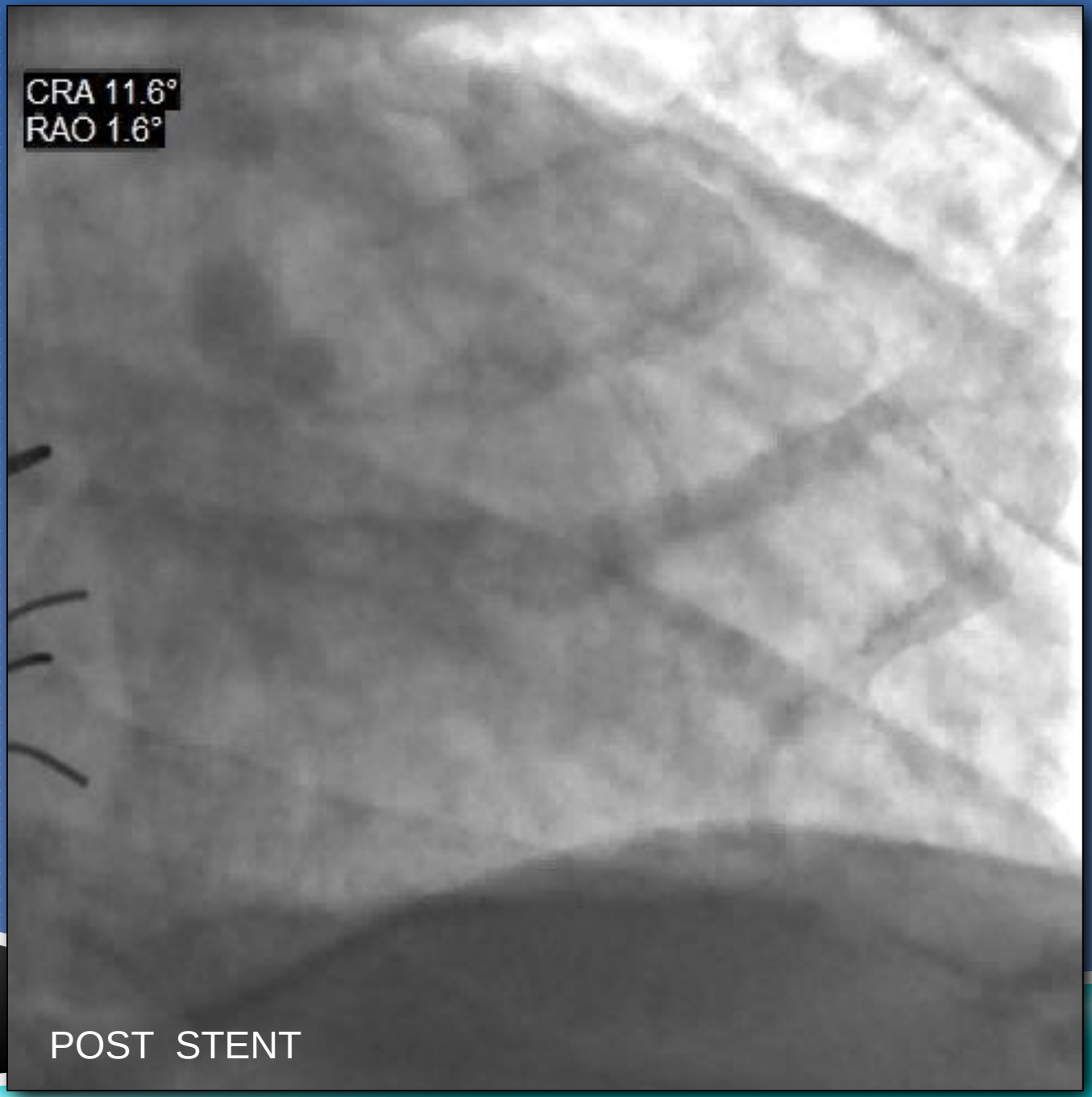
Sep 2011

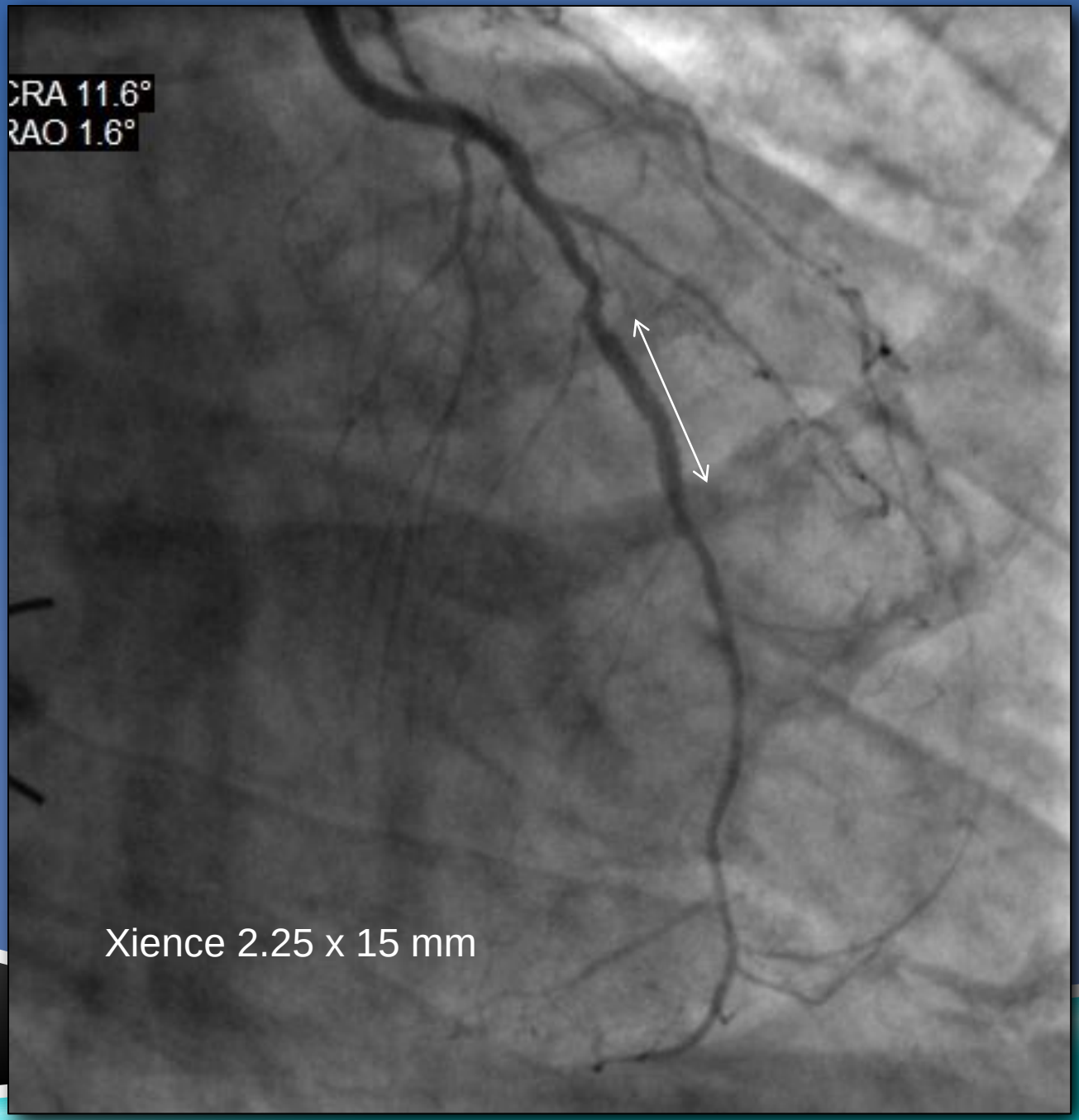

CAU 23.3°
LAO 3.0°
LAD
Dominant LCx

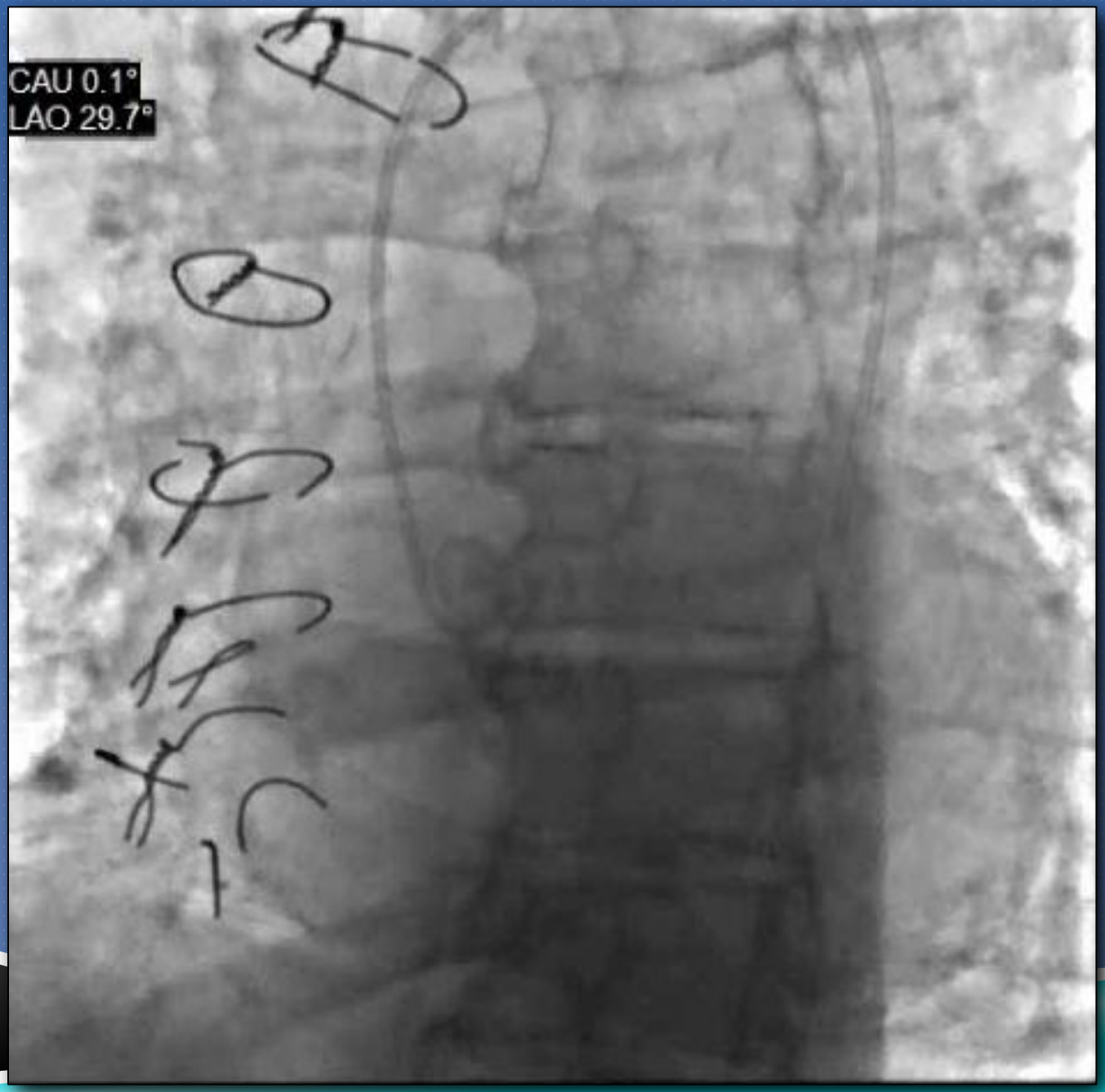

SVG
Dominant LCx


1°
7°
LAD: 99% stenosis


RAO 3.0°


CRA 11.6°
RAO 1.6°
POST STENT

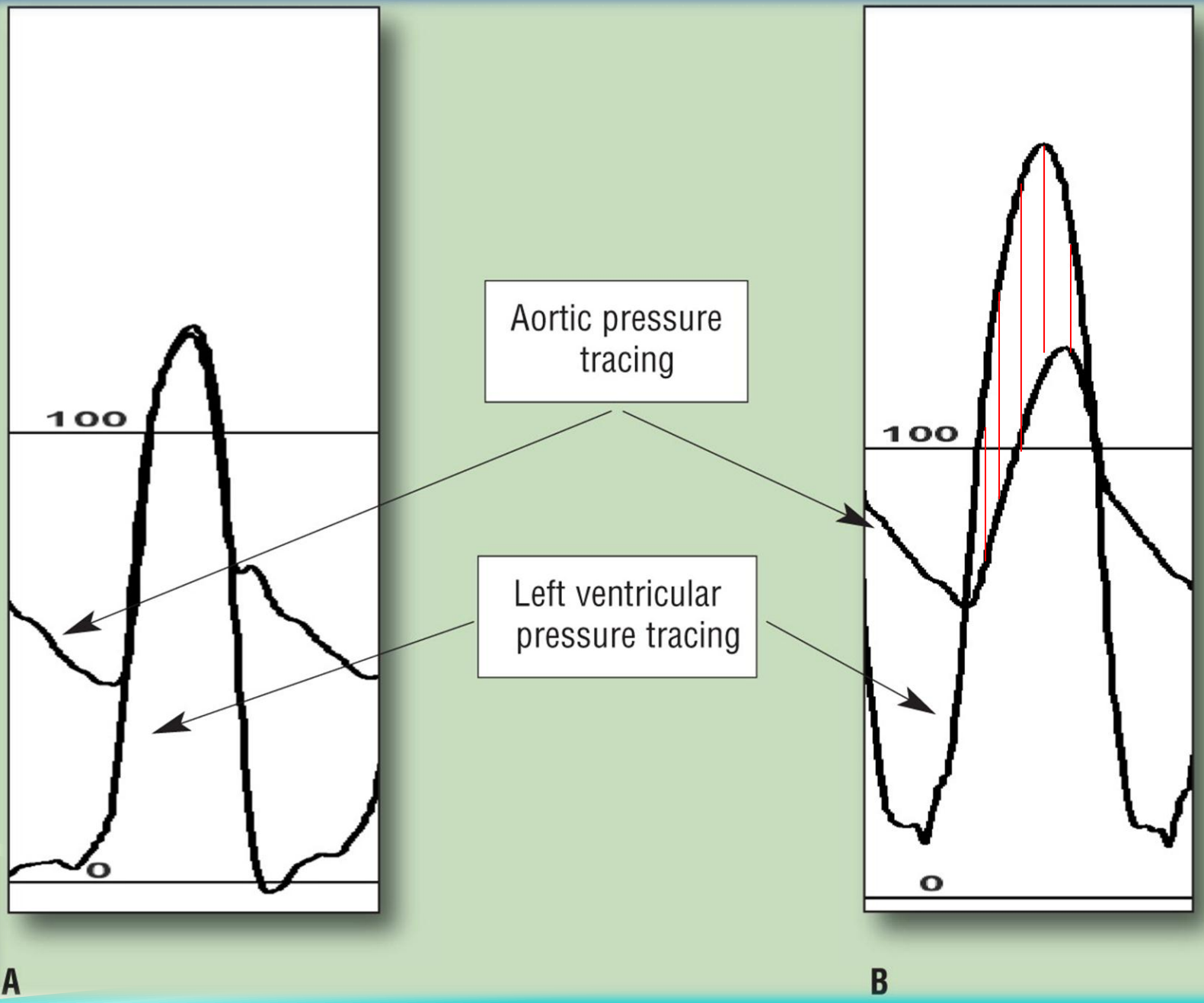

CRA 11.6°
RAO 1.6°
Xience 2.25 x 15 mm

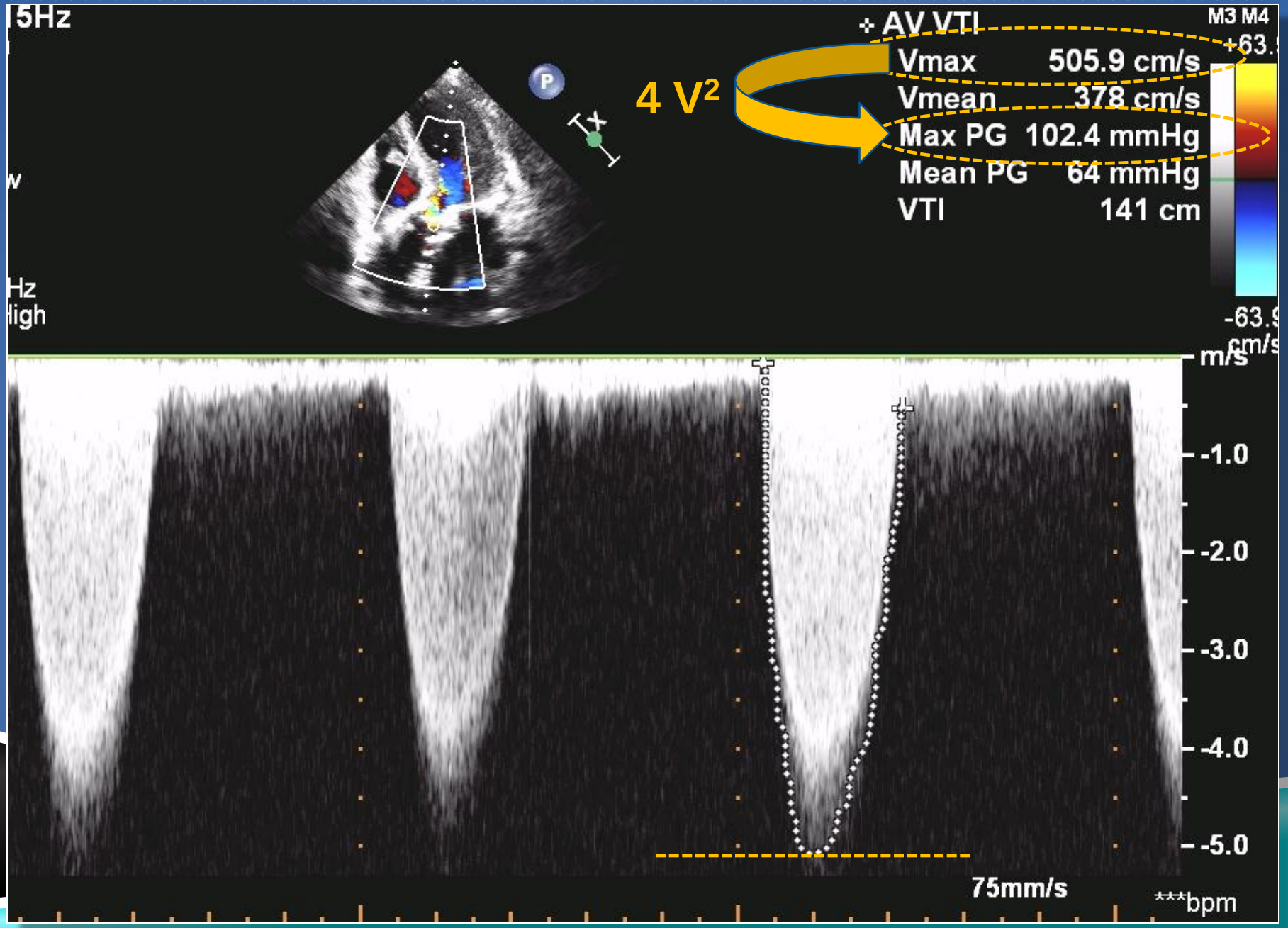

CAU 0.1°
LAO 29.7°

HEMODYNAMICS

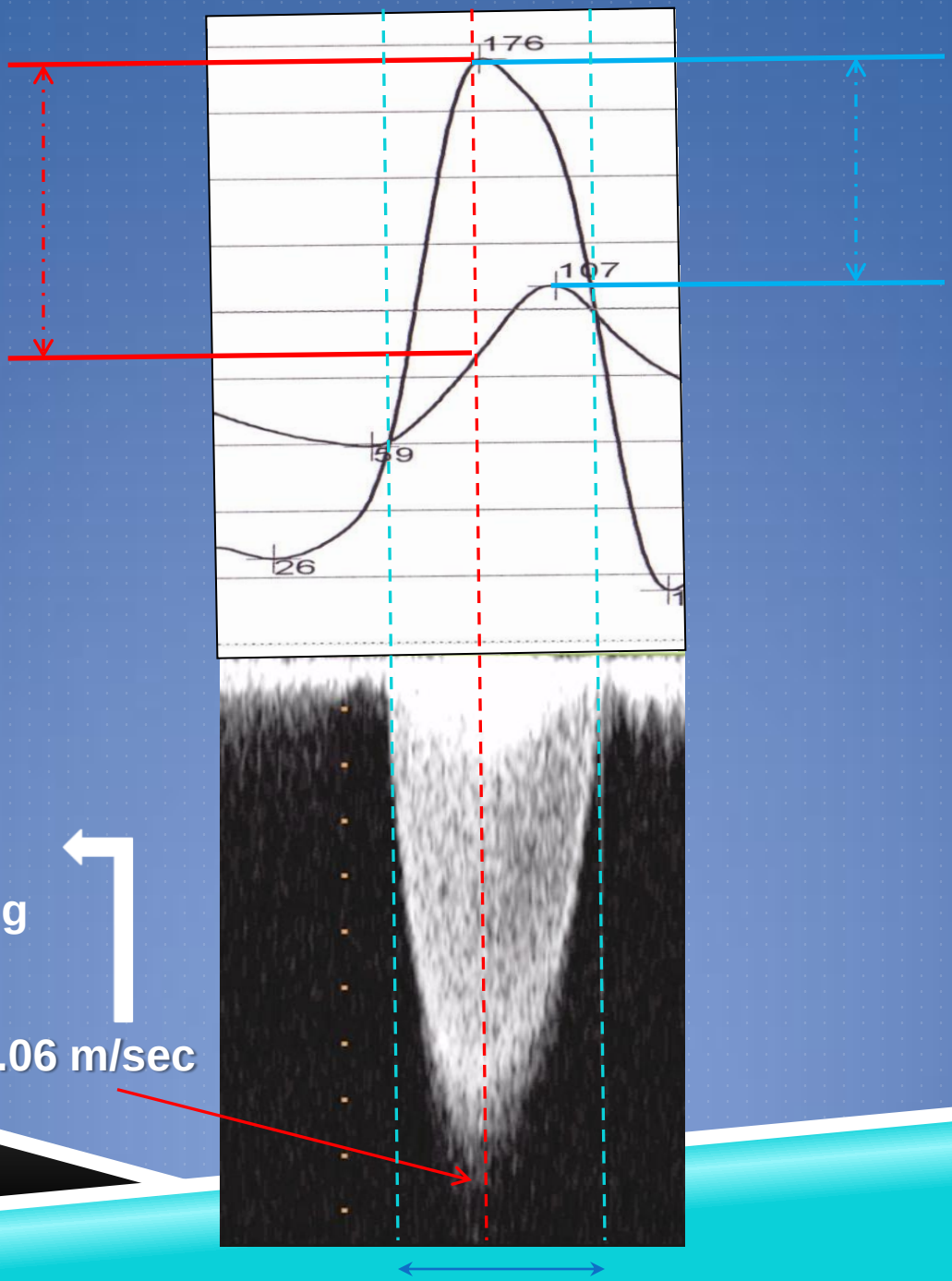
Echo-Doppler has become the gold standard in functional evaluation of Valvular heart disease

GRADIENT IN CATH LAB.


Aortic pressure tracing
Left ventricular pressure tracing
100
0
100
0
A
B


5Hz
w
Hz
igh
P
4 V2
AV VTI
Vmax 505.9 cm/s
Vmean 378 cm/s
Max PG 102.4 mmHg
Mean PG 64 mmHg
VTI 141 cm
M3 M4
+63.
-63.
cm/s
m/s
-1.0
-2.0
-3.0
-4.0
-5.0
75mm/s
***bpm

Maximal Instantaneous Pressure Gradient:
100 mmHg



Peak-to-Peak Pressure Gradient:
70 mmHg

Max. Instantaneous Pressure Gradient
$4 \times V_{max}^2 = 102$ mmHg

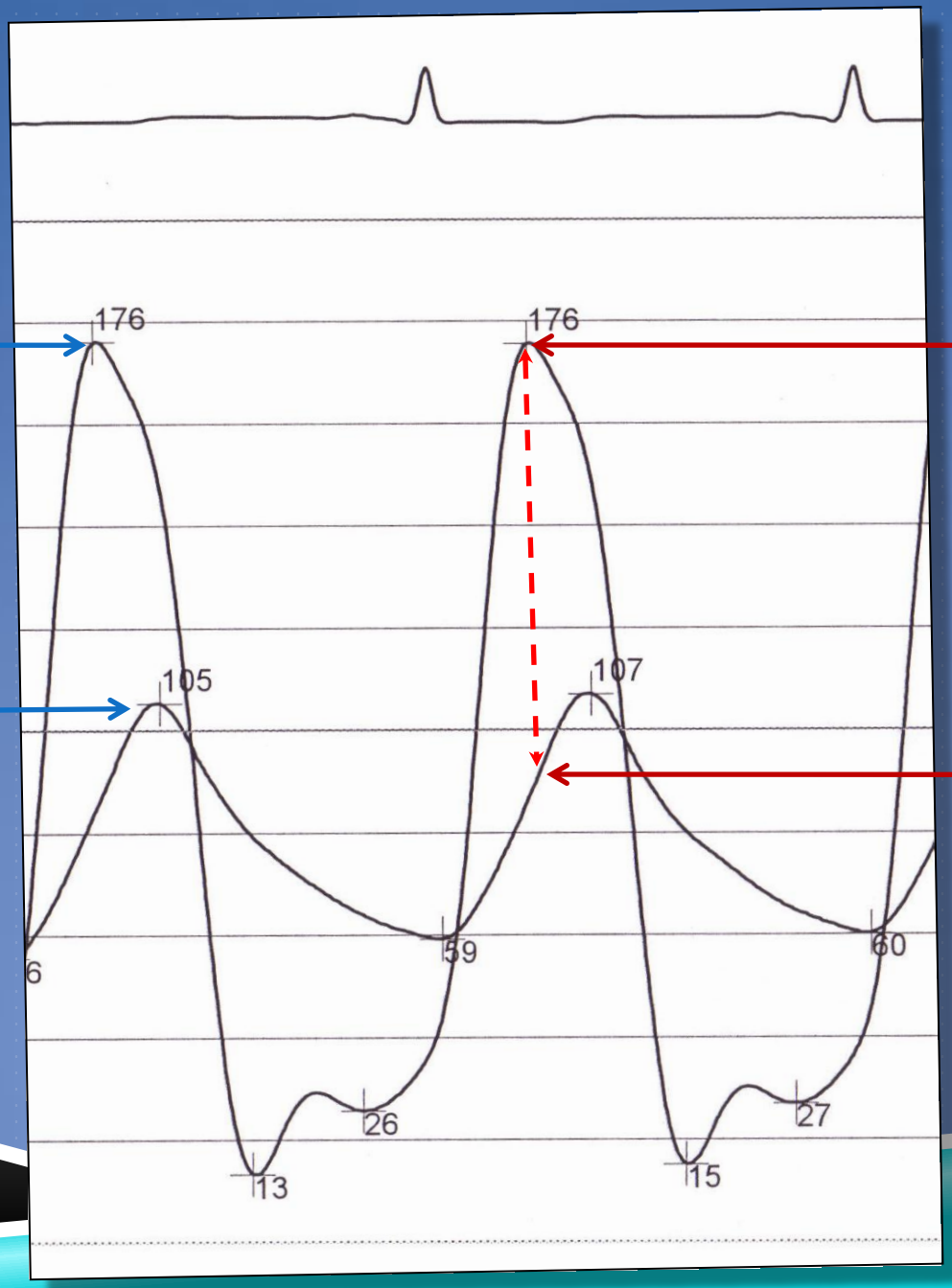
$V_{max} = 5.06$ m/sec

CATH LAB

ECHO LAB

CCL NURSE :
"Peak-to-Peak Gradient 70 mmHg"

Tele NURSE:
"Uh? Max Gradient was 100 mm Hg"



Mean Gradient: 65 mmHg

Mean Gradient: 65 mmHg

Mean Gradient

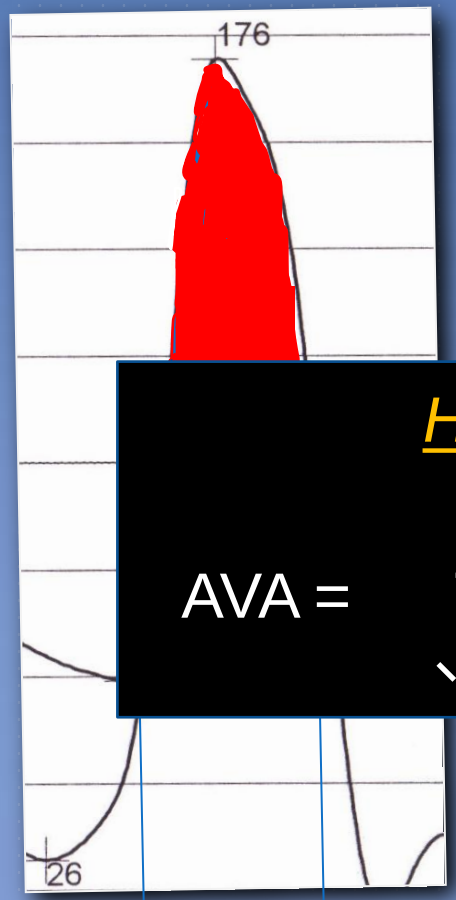
CATH LAB

ECHO LAB

Area (red) or TVI (Doppler)

Ejection Period

Mean Gradient: 65 mmHg

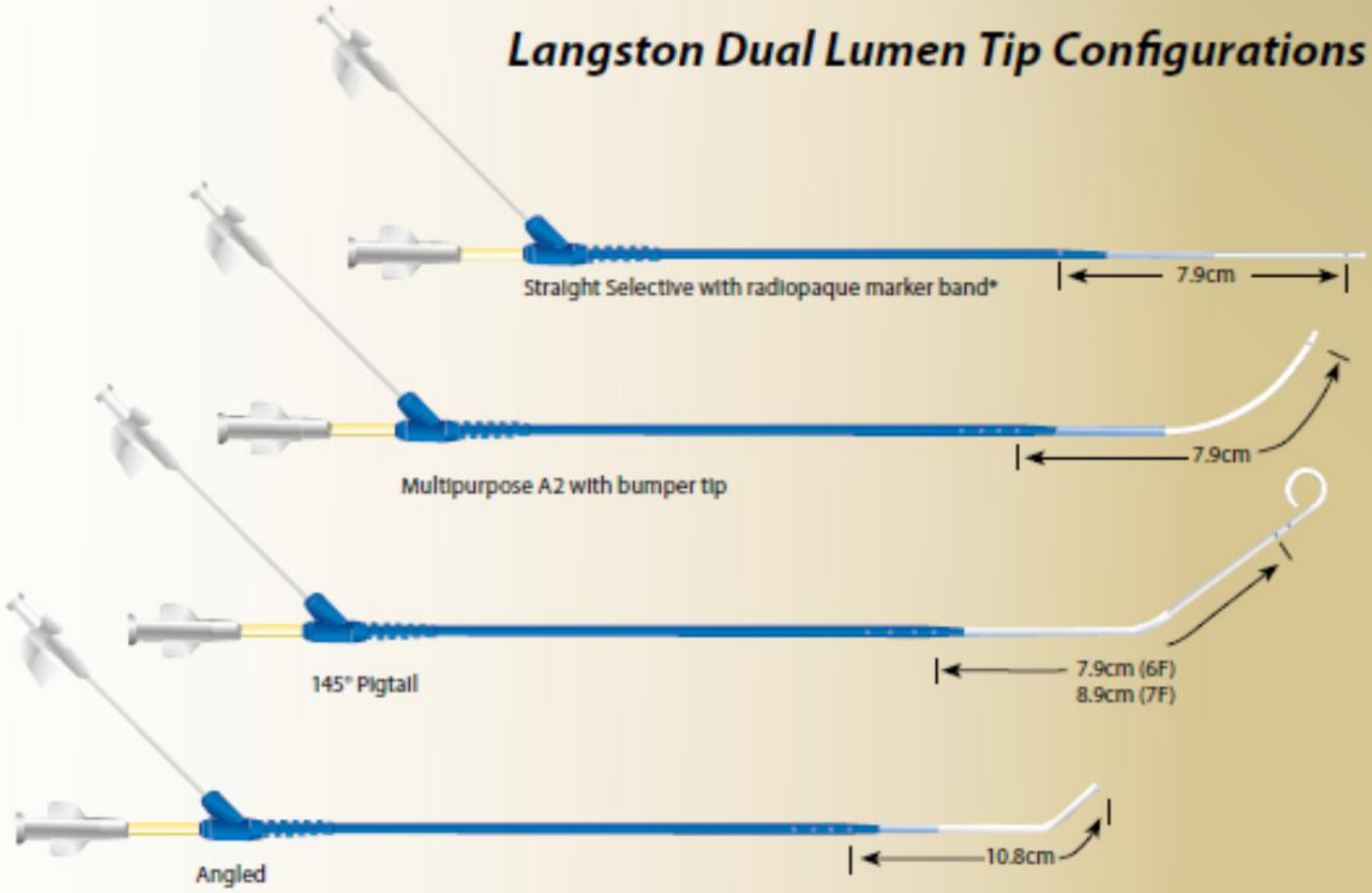


Hakki formula

$$AVA = \frac{CO}{\sqrt{\text{mean grad}}}$$

SEP

Langston Dual Lumen Tip Configurations



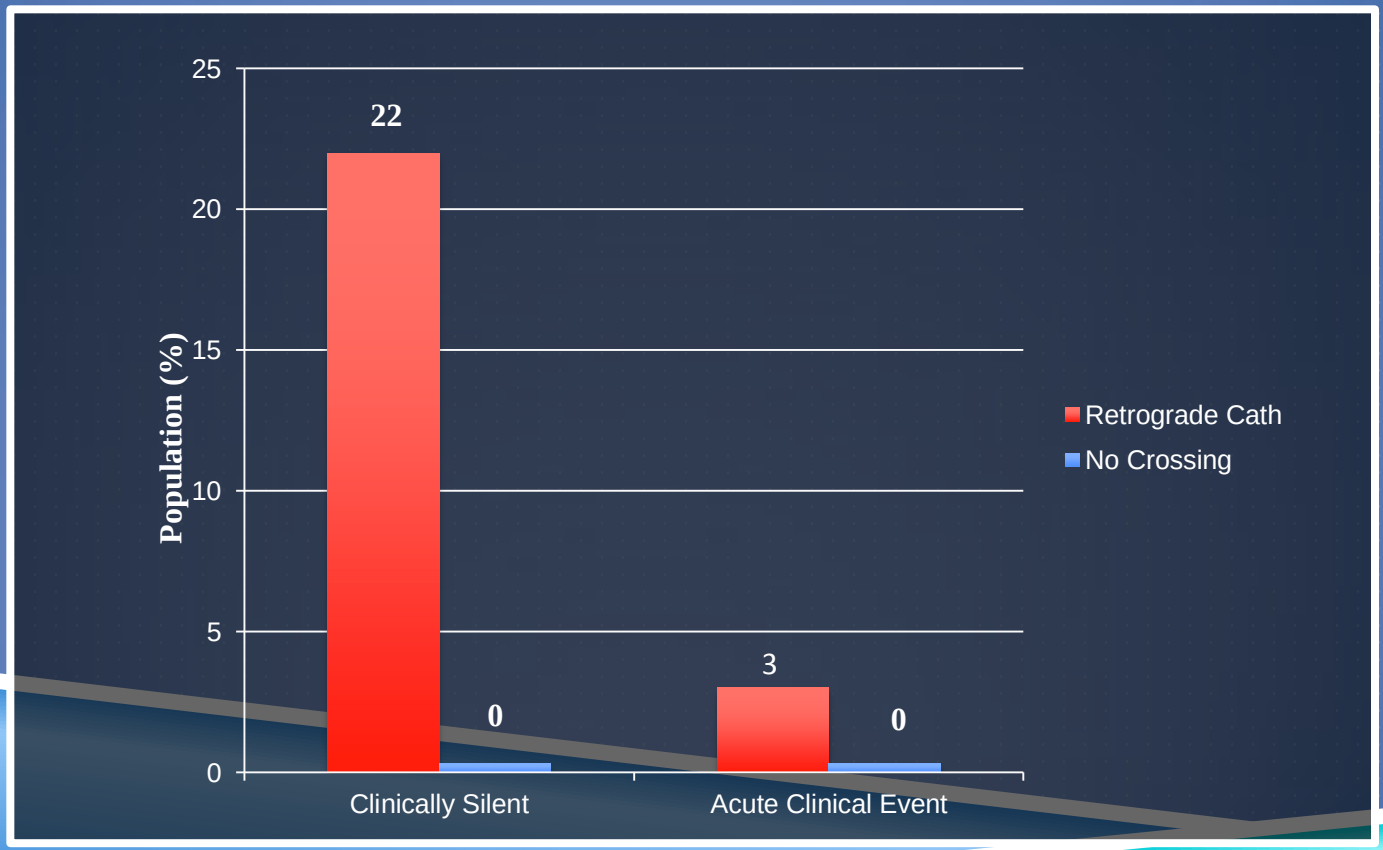
*Marker band location 1cm distal to outer lumen sideholes

Vascular SOLUTIONS
Bringing Solutions to Vascular Medicine

Crossing the Aortic Valve: Is it safe?

Risk of Cerebral Embolism With Retrograde Catheterization in AS

N = 152 consecutive AS patients randomized to cath with (n=101) or without (n=51) crossing the aortic valve assessed by cranial MRI 48 hours before and after



Omran H, et al. *Lancet.* 2003; 361:1241-1246.

ACC/AHA PRACTICE GUIDELINES—EXECUTIVE SUMMARY

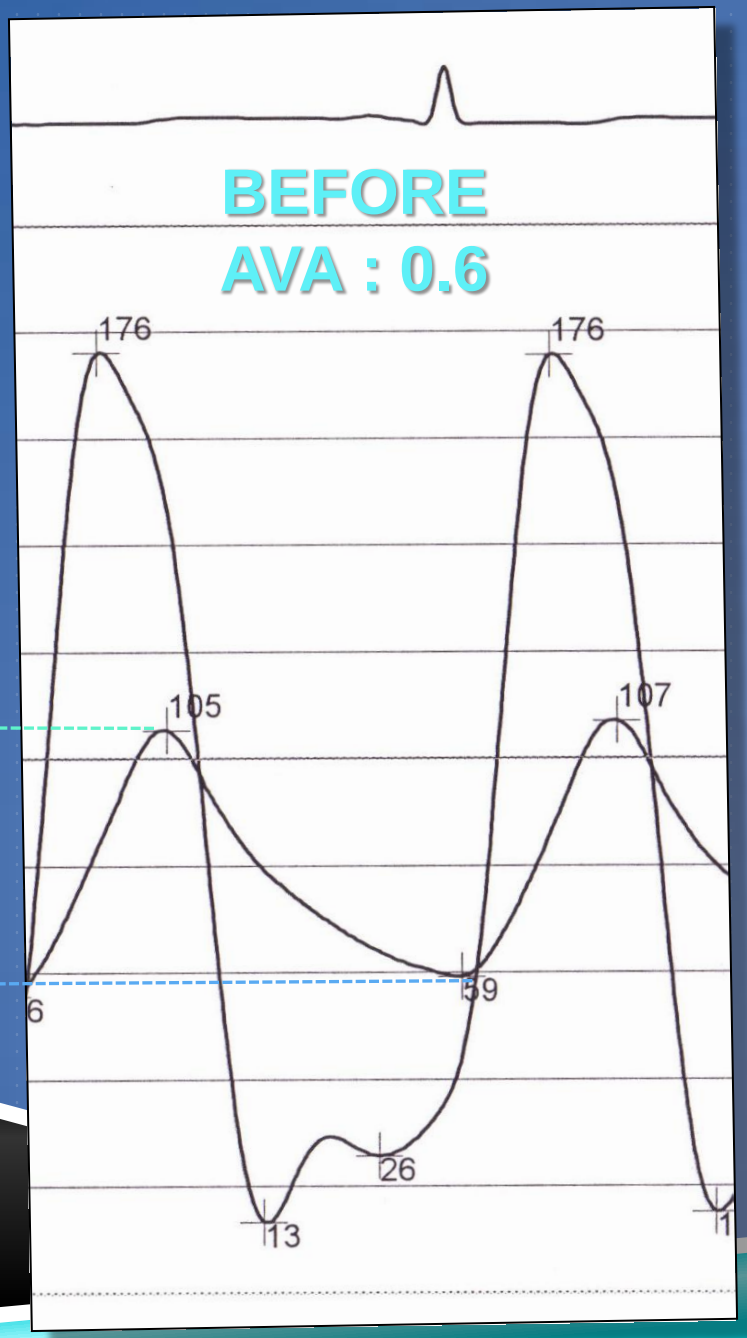
ACC/AHA 2006 Practice Guidelines for the Management of Patients With Valvular Heart Disease: Executive Summary

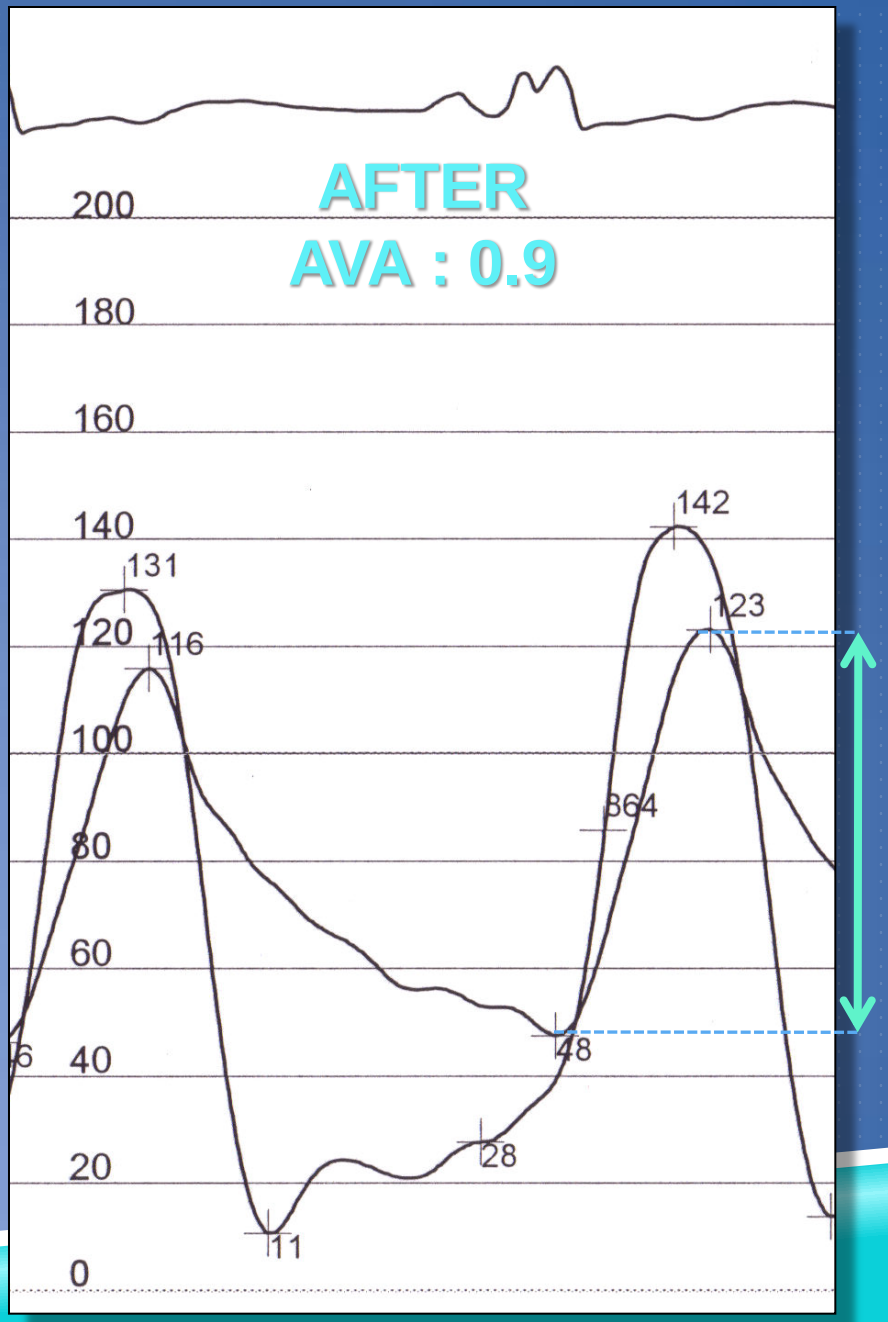
Class III

Cardiac catheterization for hemodynamic measurements is not recommended for the assessment of severity of AS before AVR when noninvasive tests are adequate and concordant with clinical findings. (Level of Evidence: C)

Mr. G. WAS SYMPTOMATIC AND UNDERWENT A BALLOON VALVULOPLASTY AS A BRIDGE THERAPY FOR TAVR (ABOUT TO BE APPROVED)

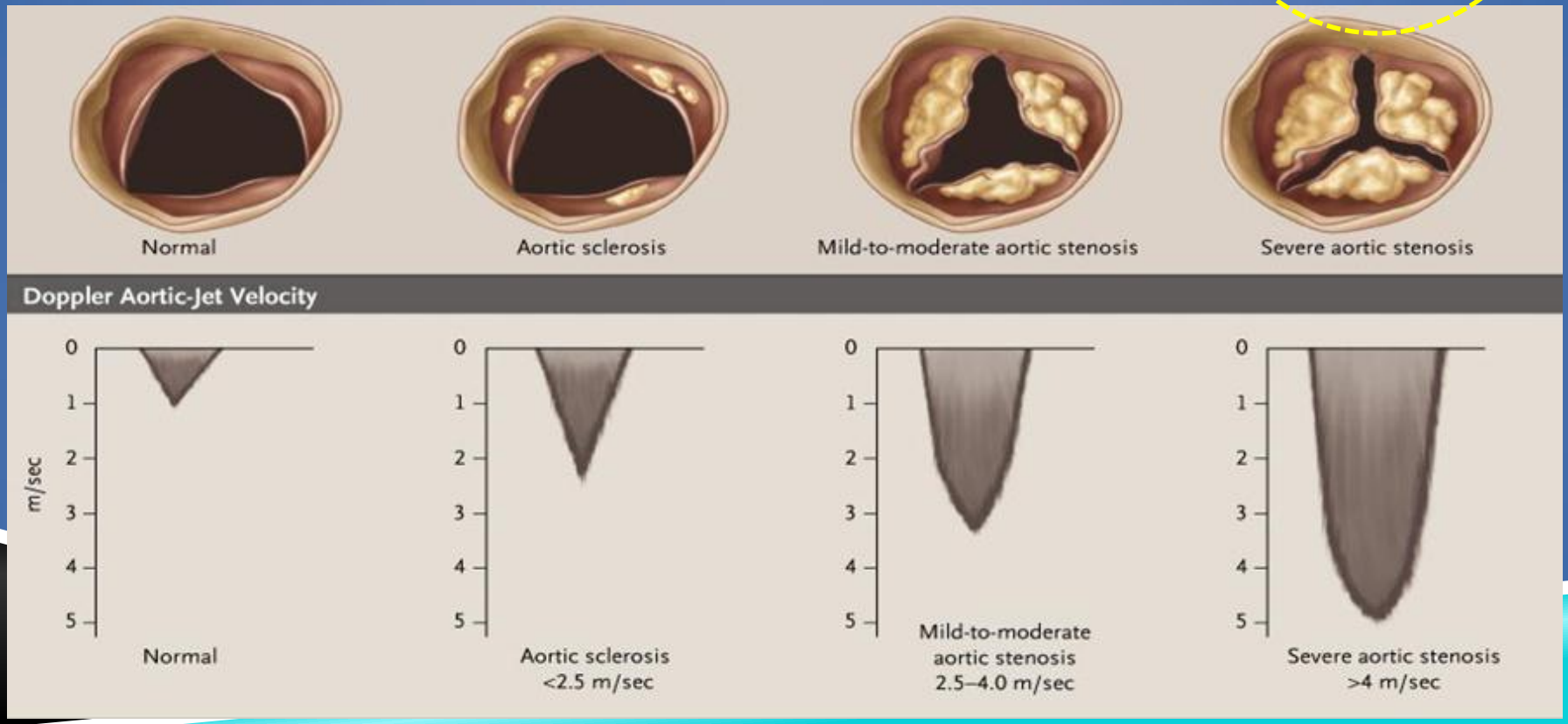
Tyshak Balloon 22 mm x 6 mm


BEFORE
AVA : 0.6
176
176
105
107
6
59
26
13
1

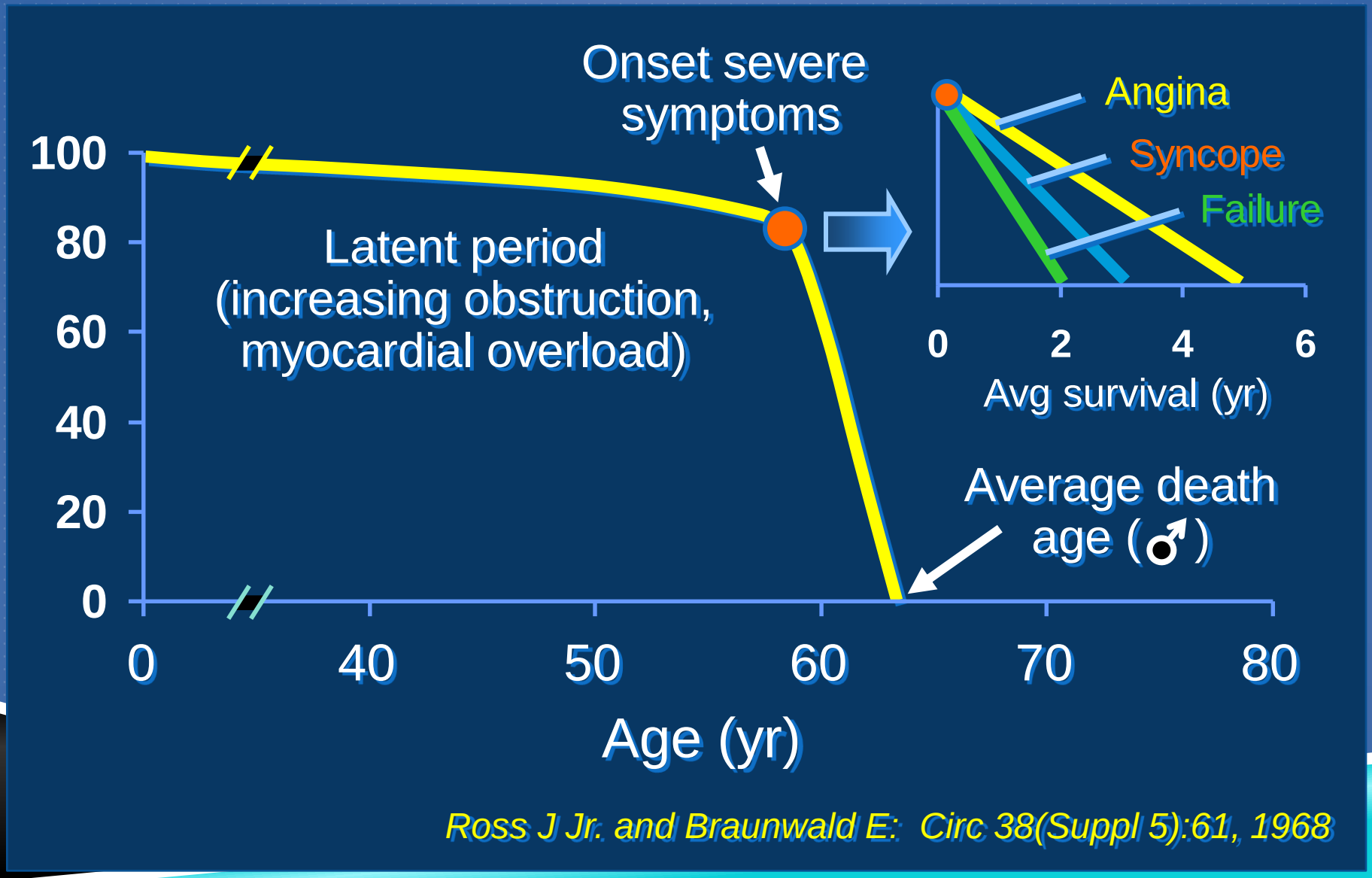

AFTER
AVA : 0.9
200
180
160
140
120
100
80
60
40
20
0
142
131
123
116
864
6
48
28
11

AS SEVERITY

	MILD	MODERATE	SEVERE
Doppler Velocity	< 3.0 m/sec	3.0-4.0 m/sec	> 4.0 m/sec
Mean Gradient	< 25 mmHg	25-40 mmHg	> 40 mmHg
AVA	1.5 cm^2	1-1.5 cm^2	< 1.0 cm^2



Survival in Severe Aortic Stenosis



Ross J Jr. and Braunwald E: Circ 38(Suppl 5):61, 1968

TAKE HOME MESSAGE:

WHEN TO OPERATE PATIENTS WITH Aortic Stenosis?

When patient develops symptoms!

COMMENTS:

1. IS PATIENT TRULY ASYMPTOMATIC?
   ROLE STRESS TESTING

2. LOW GRADIENT BUT SEVERE STENOSIS:

LOW FLOW THROUGH
THE VALVE

LV SYSTOLIC DYSF.
(LOW EF)

SMALL LV CAVITY
(NORMAL OR HIGH EF)

Edwards-SAPIEN THV

- Stainless Steel Frame
- Bovine T-Leaflet
- Thermafix Treatment
- 23mm & 26mm valves
- 22F & 24F Delivery Systems

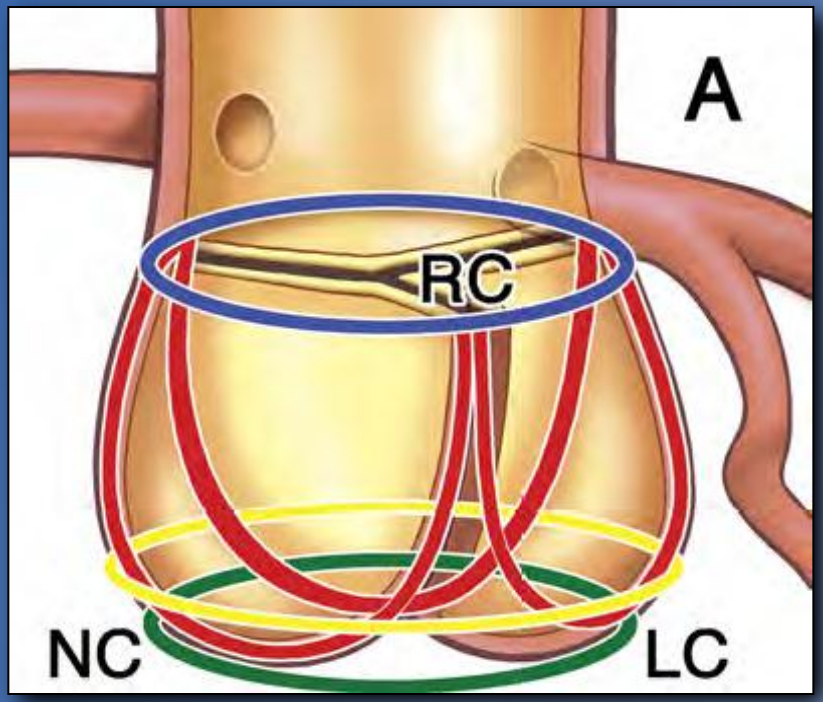
Approved by FDA in October 2011

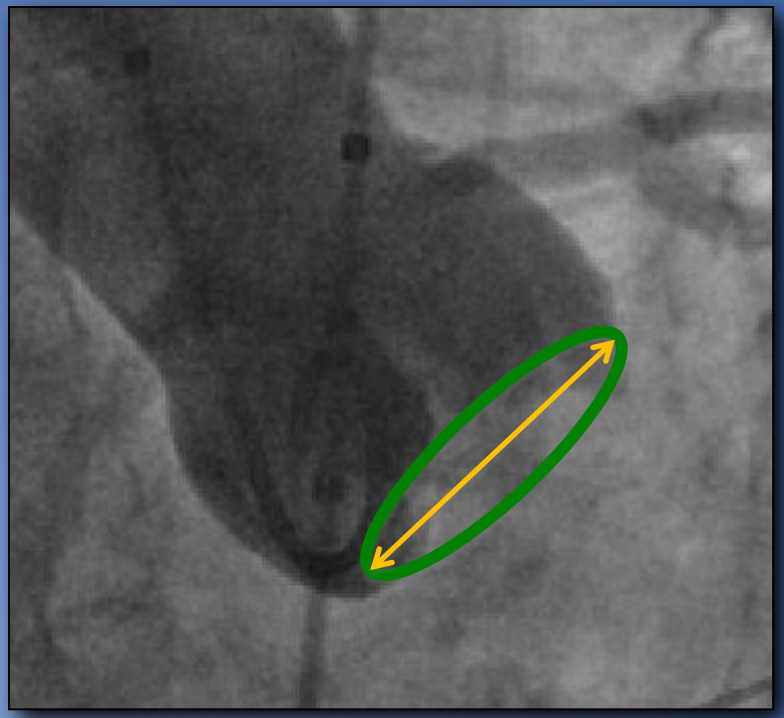
Animation

EDWARDS SAPIEN VALVE

WHAT ARE WE TRYING TO MEASURE?

WHAT TECHNIQUE: TTE? TEE? CTA?





Sinotubular junction

Aortic leaflets

Aortic Annulus

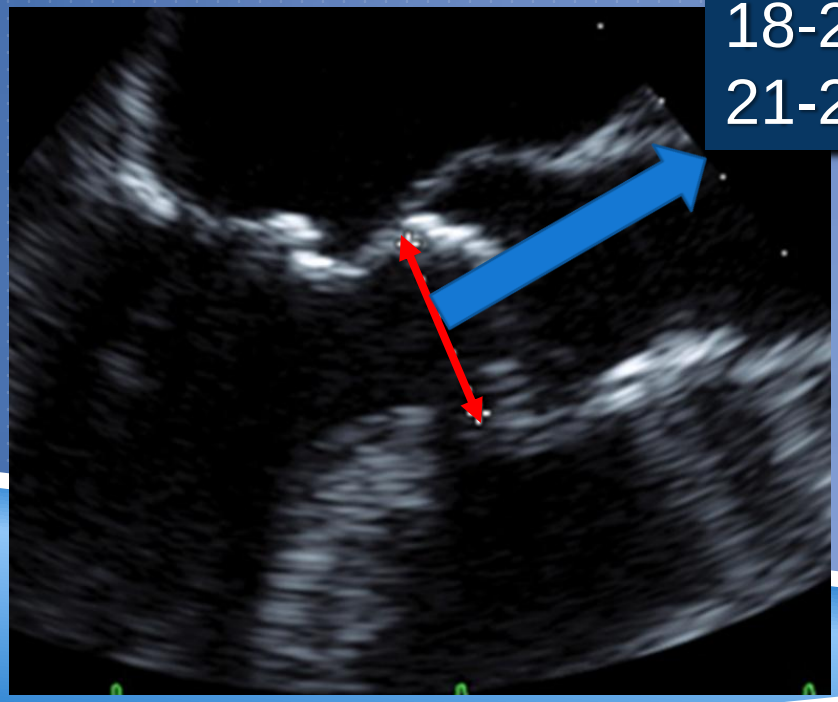
Aortic Annular Diameter

Leipsic et al JACC Img April 2011

CHOOSING A VALVE SIZE:

ANNULAR MEASUREMENT

18-22 mm annulus → 23 mm THV
21-25 mm annulus → 26 mm THV

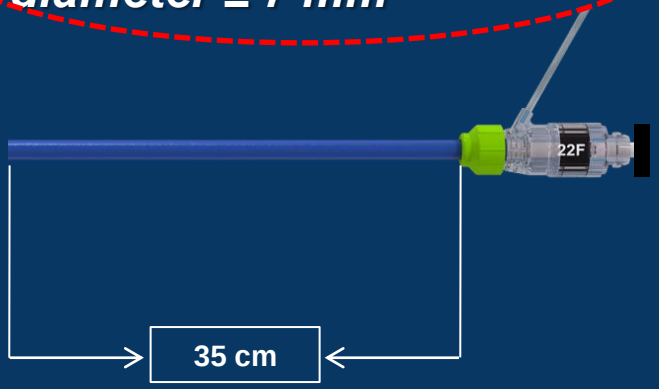


SHEATH DIMENSIONS

22F RetroFlex 3 Sheath

For 23 mm SAPIEN valve

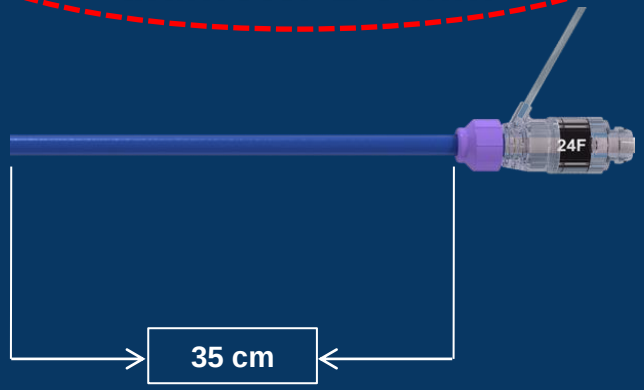
Requires minimum vessel diameter ≥ 7 mm



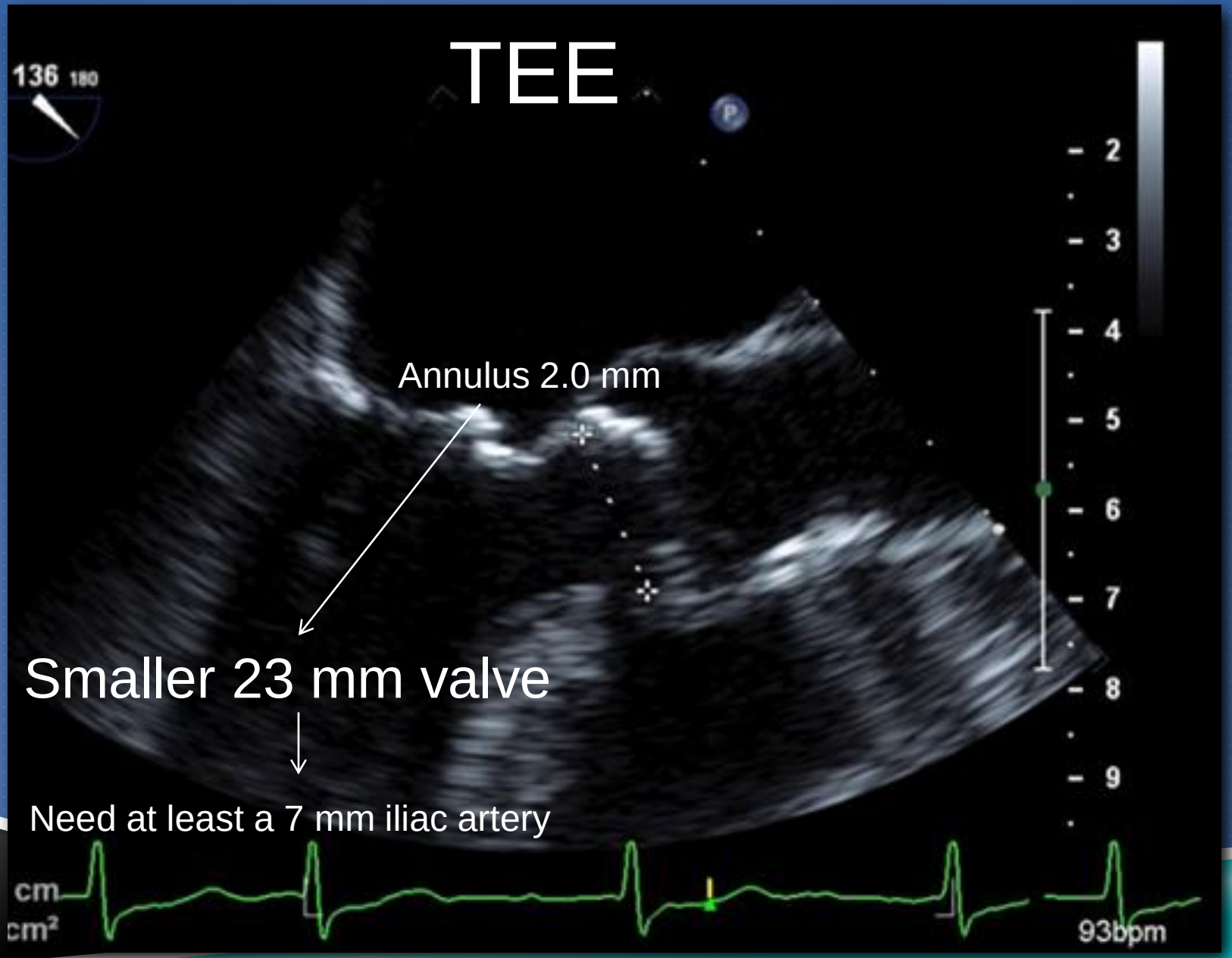
24F RetroFlex 3 Sheath

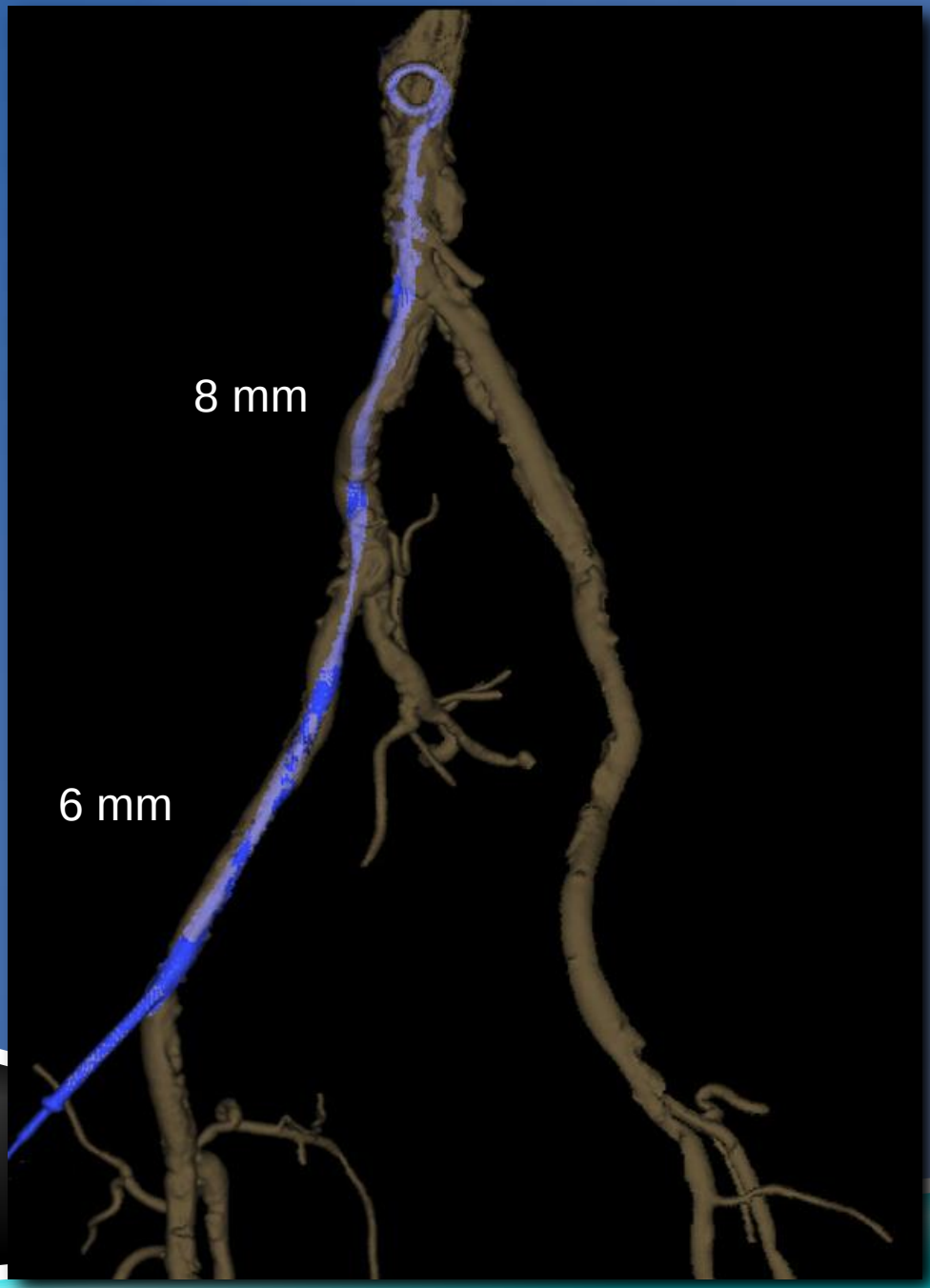
For 26 mm SAPIEN valve

Requires minimum vessel diameter ≥ 8 mm



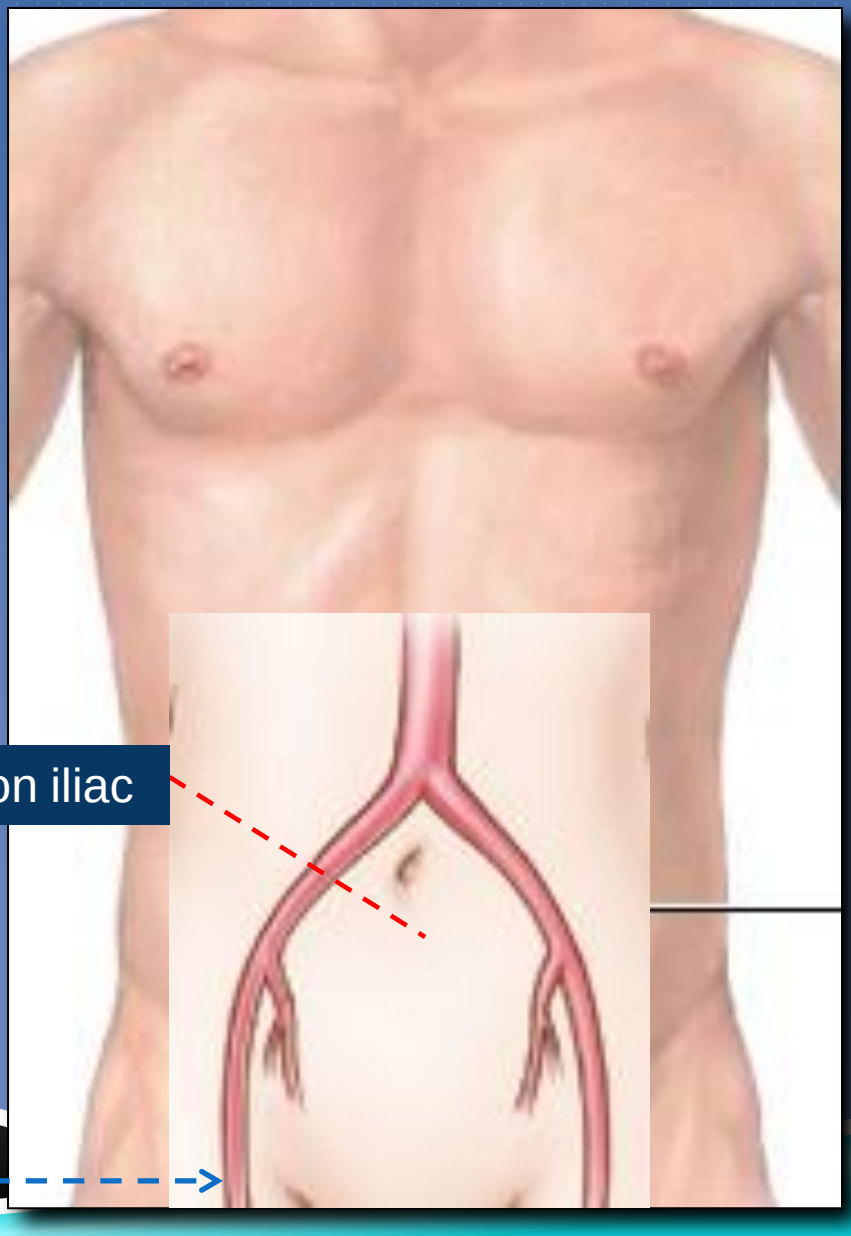
TEE


136 180
2
3
4
5
6
7
8
9
Annulus 2.0 mm
Smaller 23 mm valve
Need at least a 7 mm iliac artery
cm
cm²
93bpm



Direct intra-arterial contrast injection 10 cc of iodixanol mixed with 25 cc of saline injected at 4 cc/sec

Nietlisbach F, Leipsic J et al. CT of the Iliofemoral System using Direct Aortic Injection: Proof of Feasibility. Swiss Med Wkly. 2009 Aug

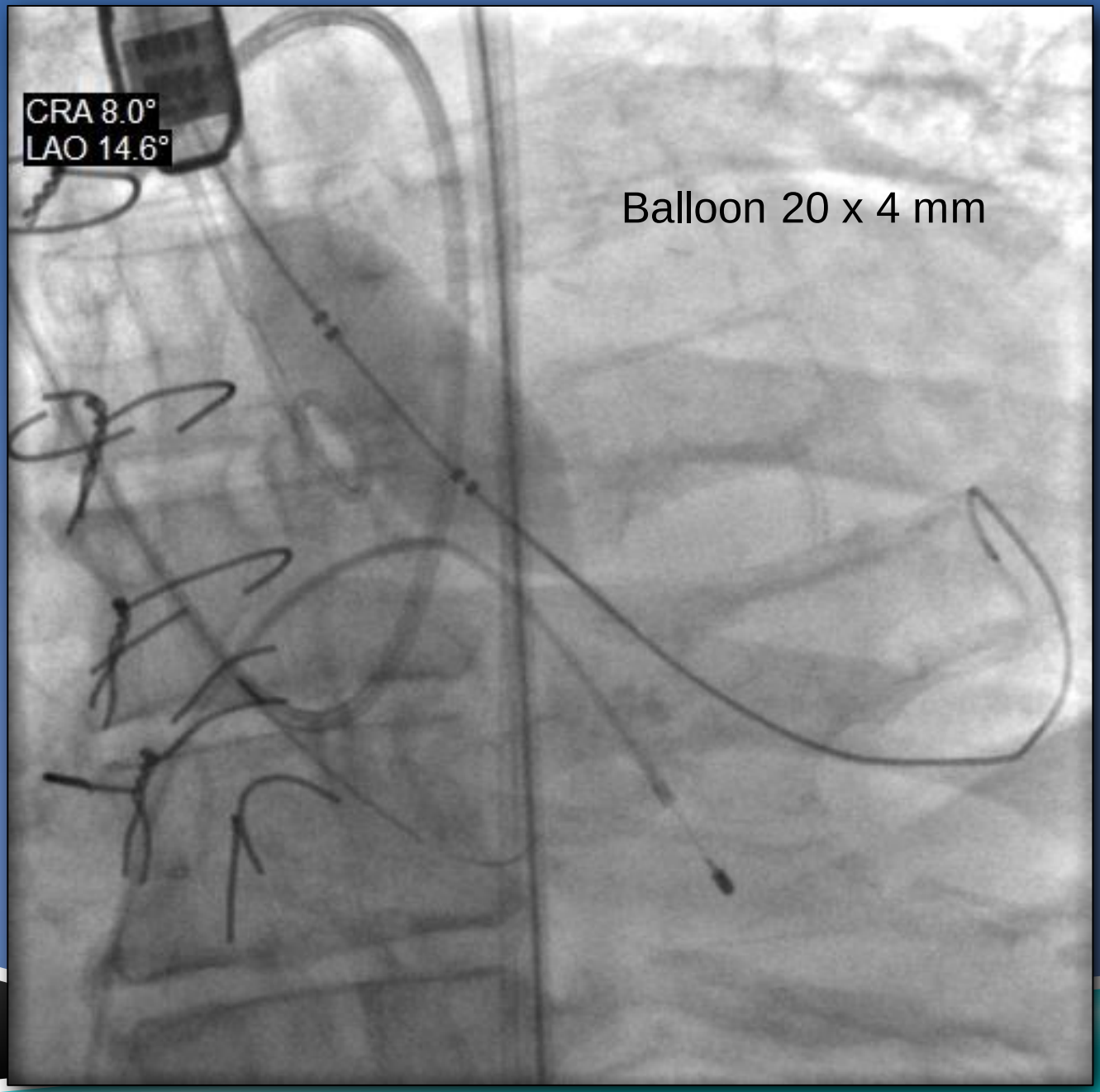


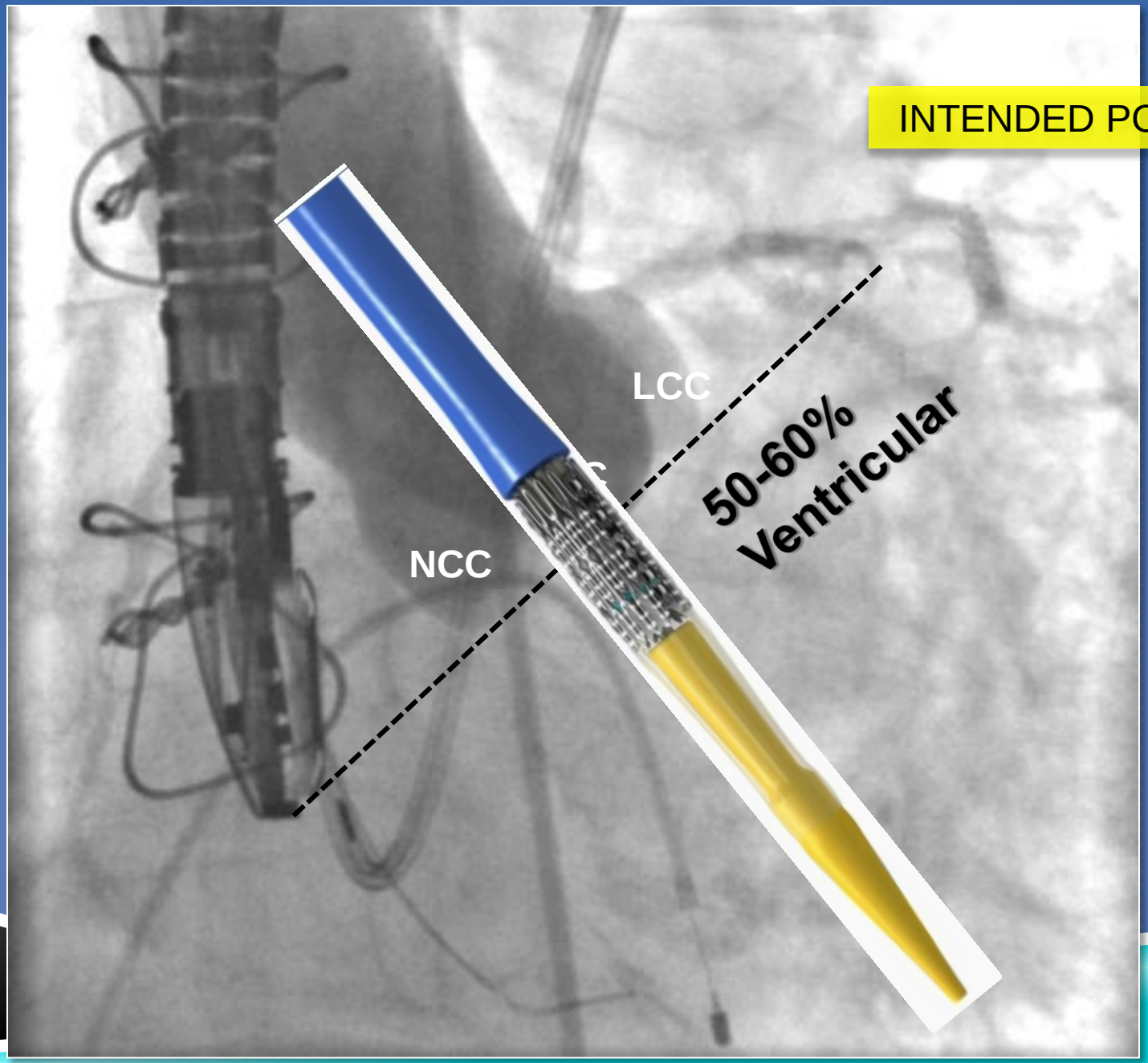
NORMAL APPROACH

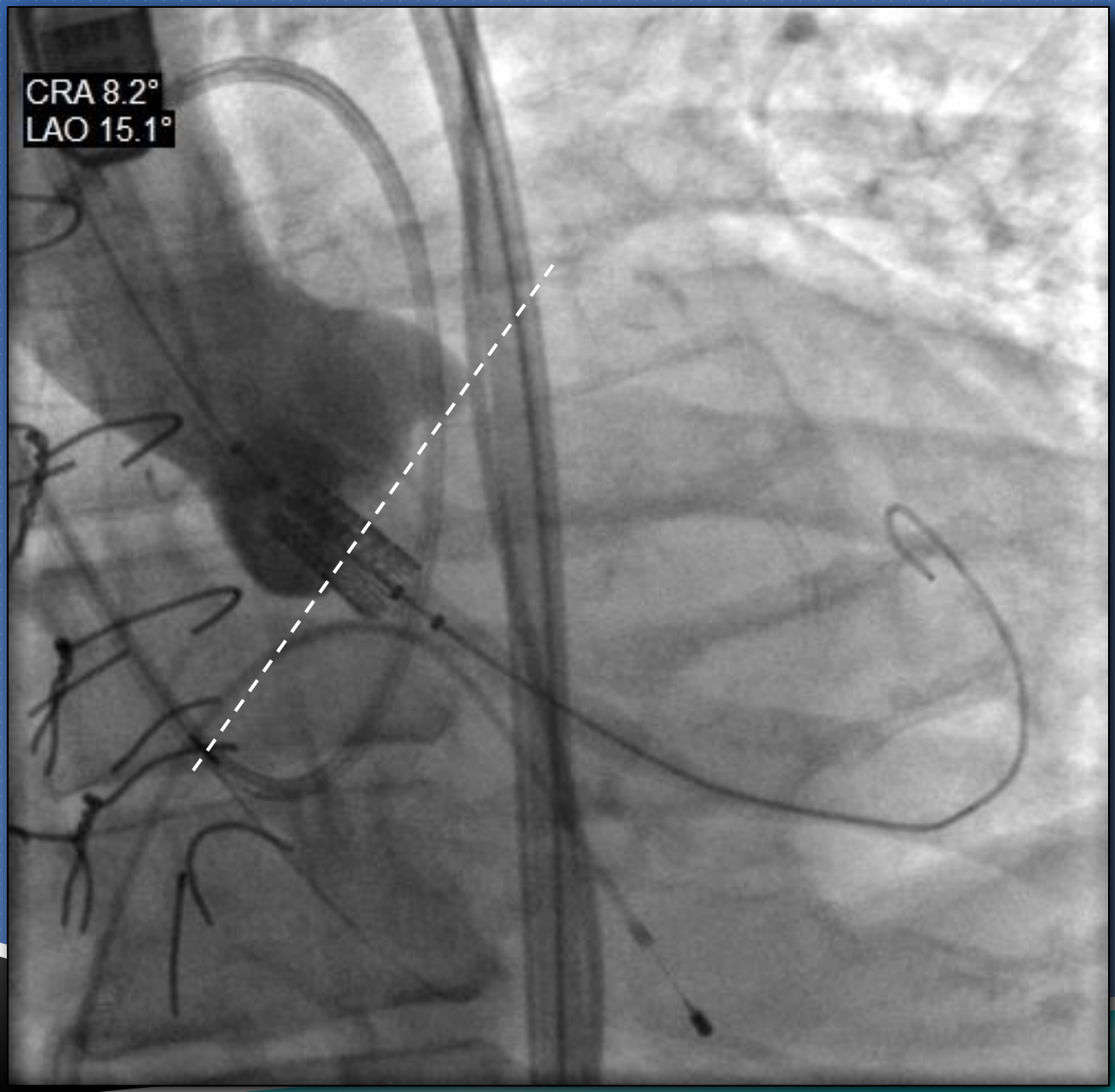
VASC SURGEON

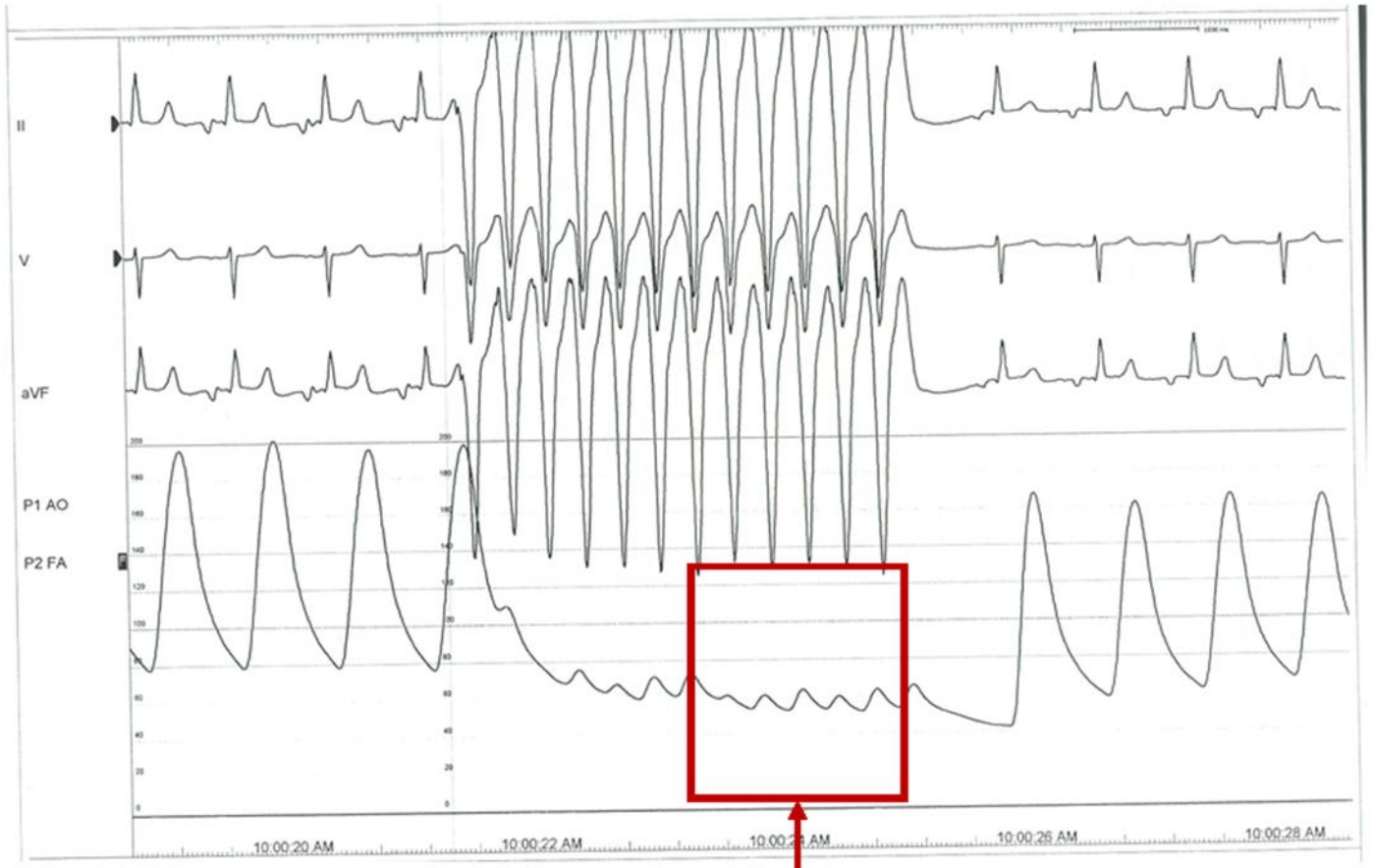
“Retroperitonal access for Mr. G”

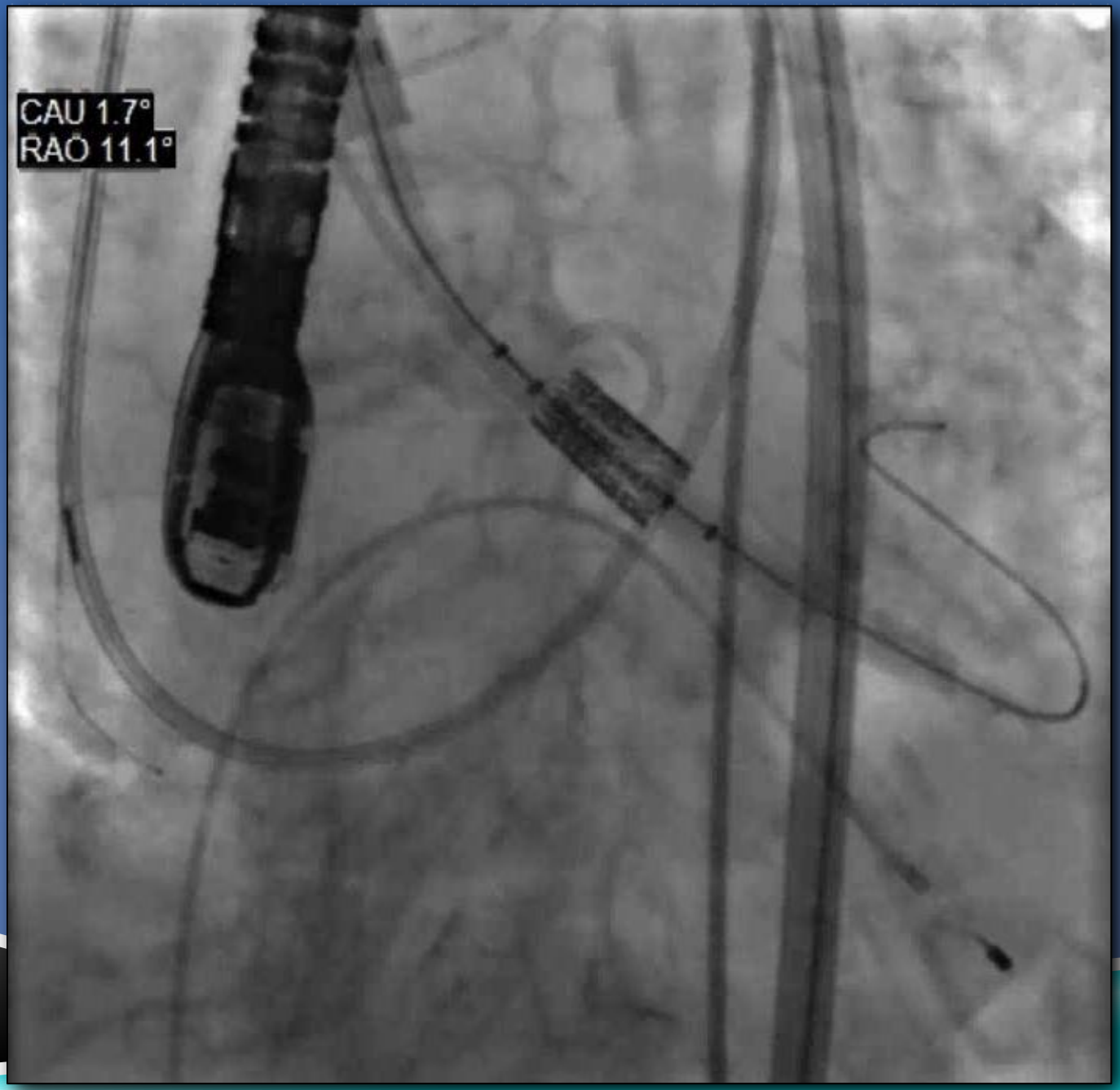

Procedure done
by a TEAM

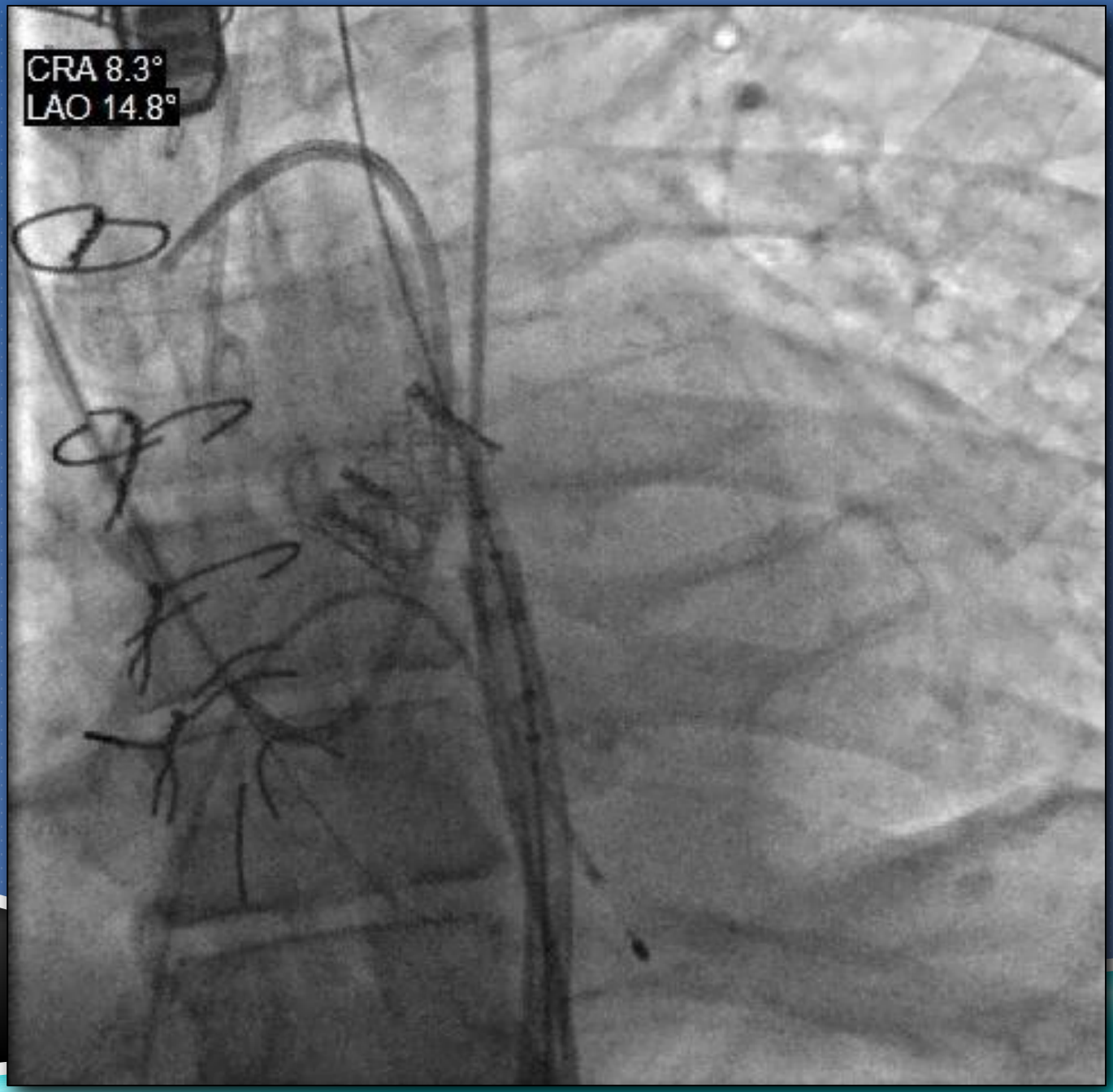

CRA 8.0°
LAO 14.6°
Balloon 20 x 4 mm


INTENDED POSITION
LCC
50-60%
Ventricular
NCC


CRA 8.2°
LAO 15.1°


II
V
aVF
P1 AO
P2 FA
10:00:20 AM
10:00:22 AM
10:00:26 AM
10:00:28 AM
Effective Pulse Pressure and Blood Pressure Reduction


CAU 1.7°
RAO 11.1°


CRA 8.3°
LAO 14.8°


Mr. G

Post op course:

Cardiac wise did very well

Slow recovery of bowel function due to ileus

Currently doing very well.

Dr. Alain Cribier
First-in-Man TAVR

April 16, 2002

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION
American Heart Association
Learn and Live

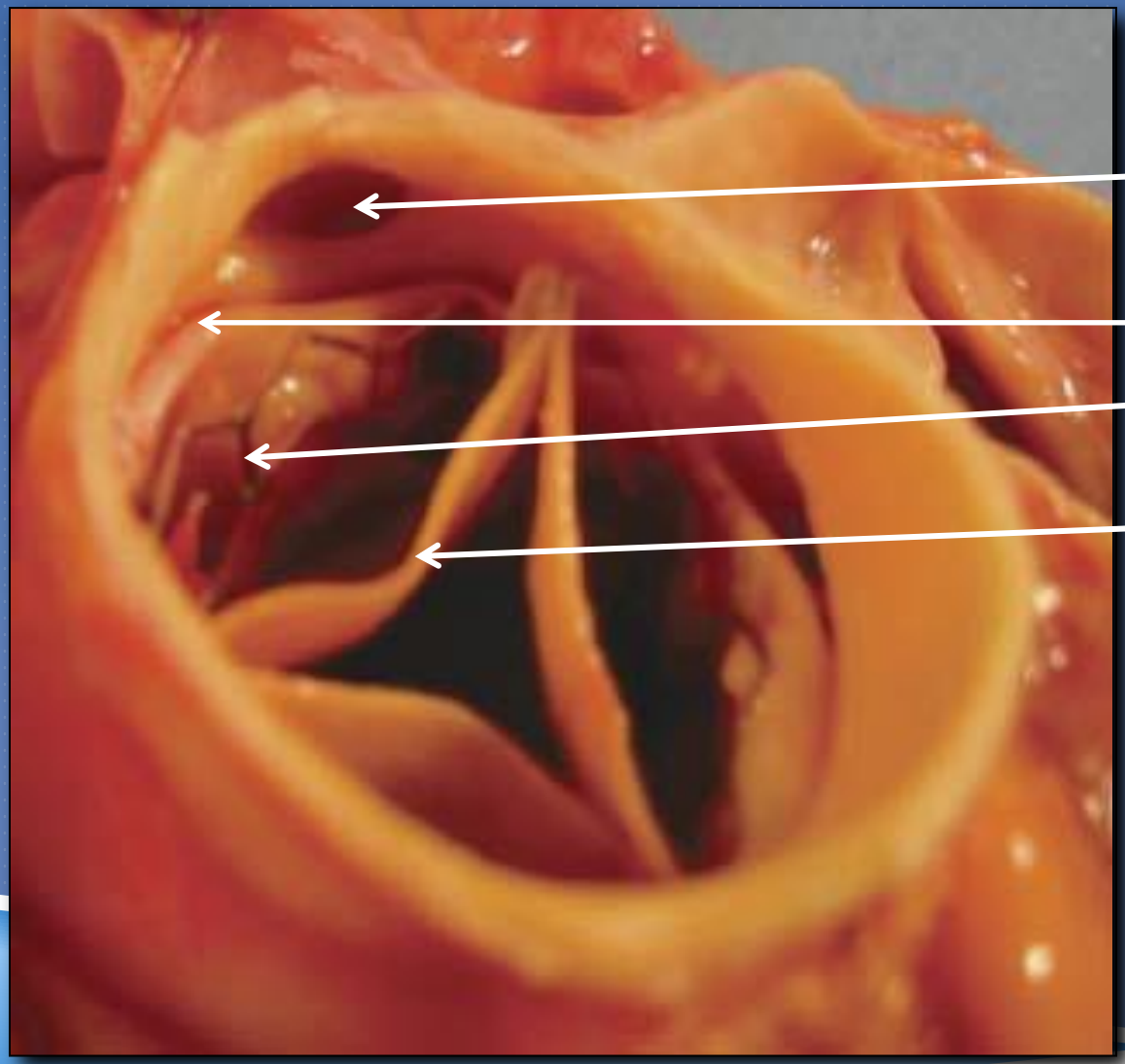
Percutaneous Transcatheter Implantation of an Aortic Valve Prosthesis for Calcific Aortic Stenosis

First Human Case Description

Alain Cribier, MD; Helene Eltchaninoff, MD; Assaf Bash, PhD; Nicolas Borenstein, MD; Christophe Tron, MD; Fabrice Bauer, MD; Genevieve Derumeaux, MD; Frederic Anselme, MD; François Laborde, MD; Martin B. Leon, MD

AHA; Nov, 2002

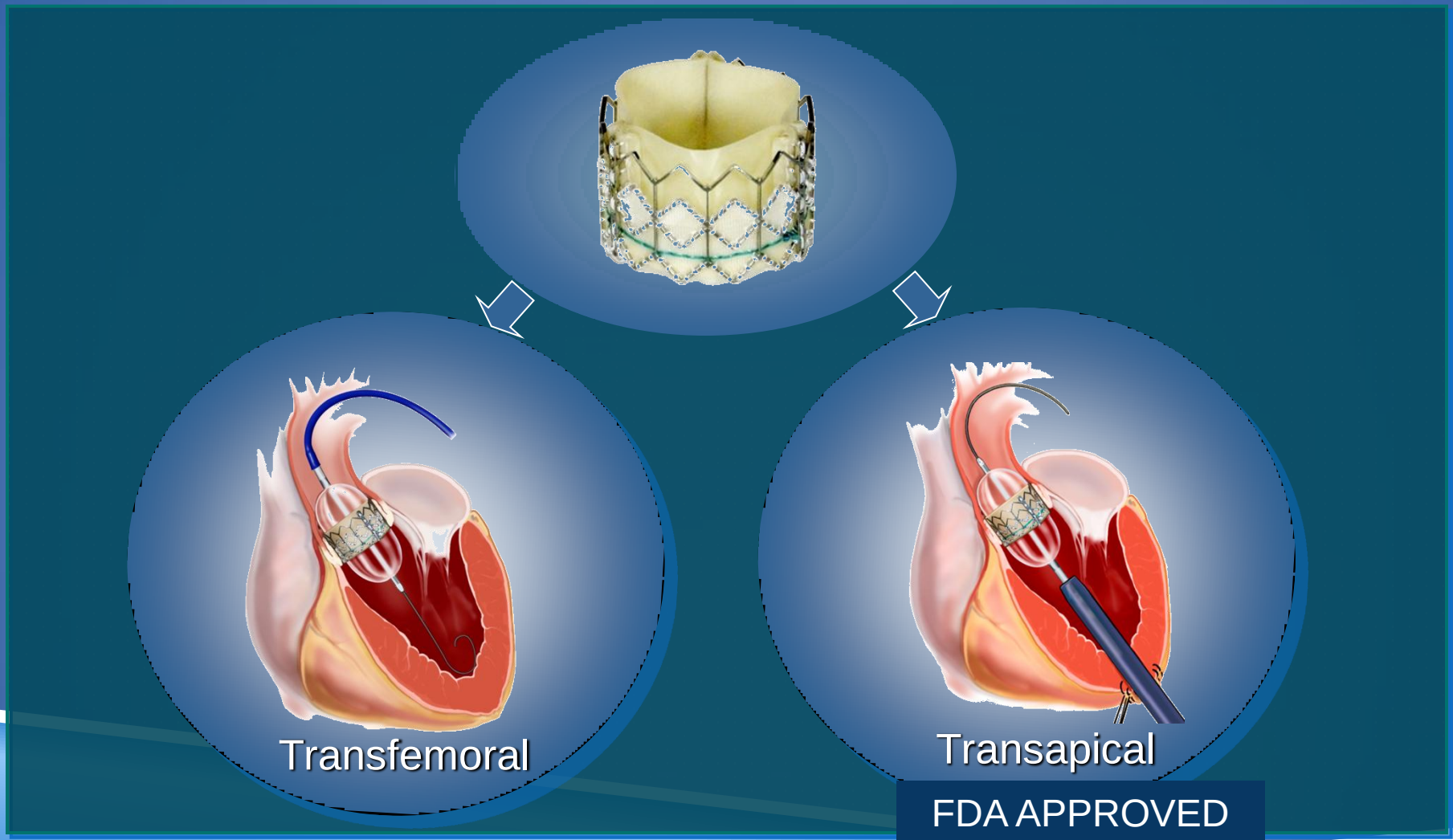
AORTIC STENT VALVE IMPLANTED



TRANSCATHETER AORTIC VALVE REPLACEMENT (TAVR)

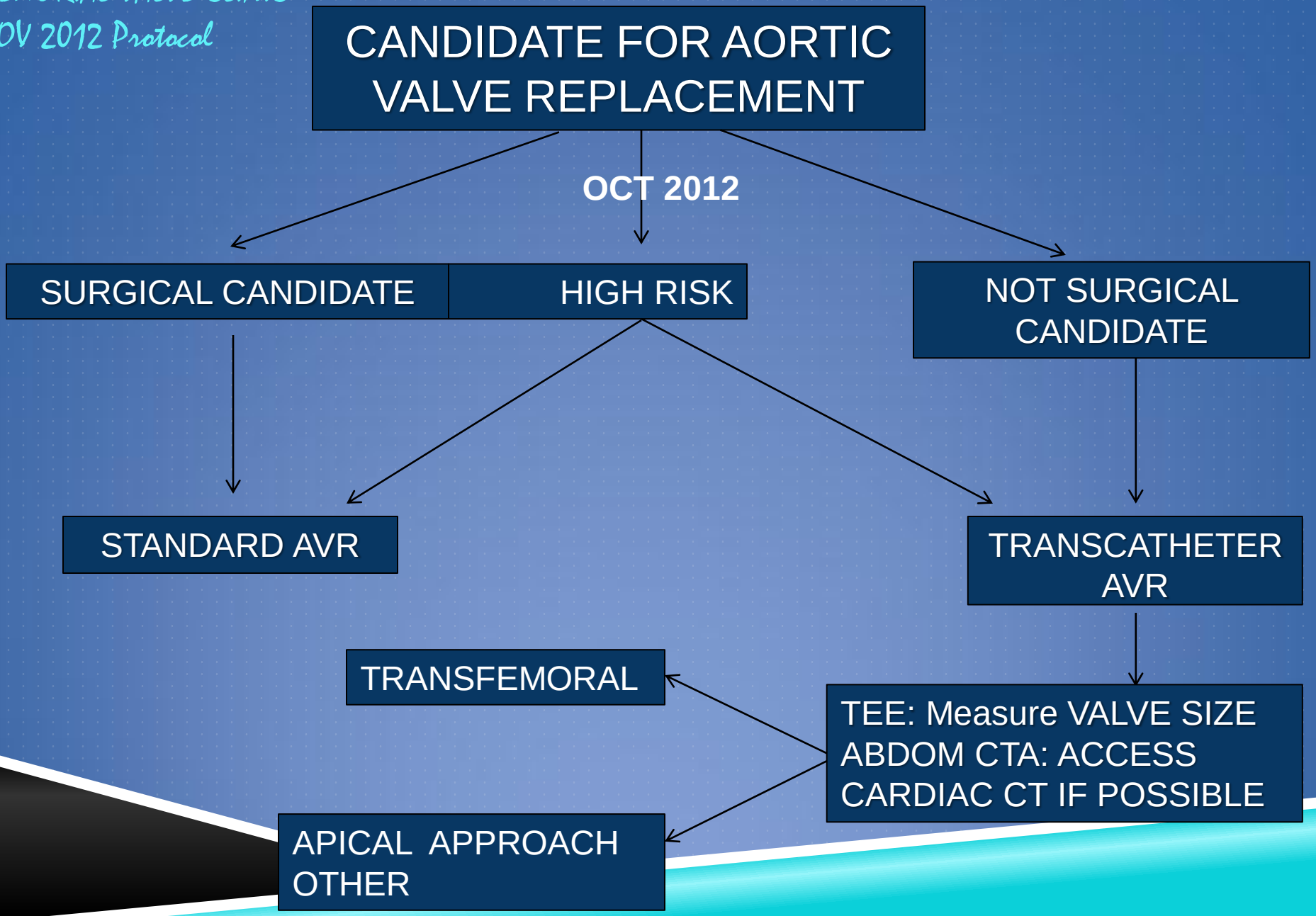
Transcatheter AVR

Femoral and Trans-apical Access

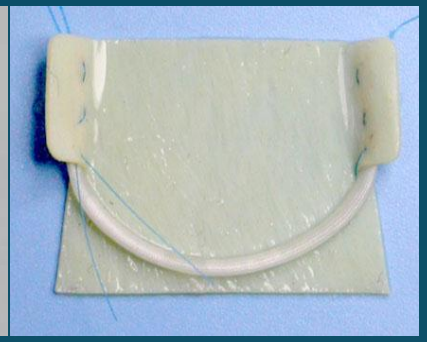


FDA APPROVED
OCTOBER 2012

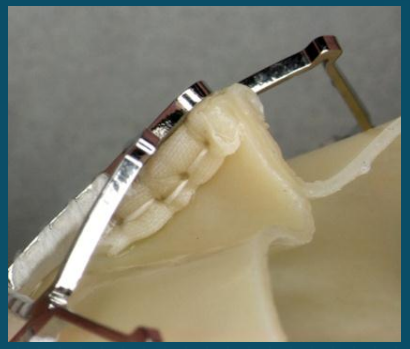
MEMORIAL VALVE CLINIC
NOV 2012 Protocol



NEXT….EDWARDS SAPIEN XT THV



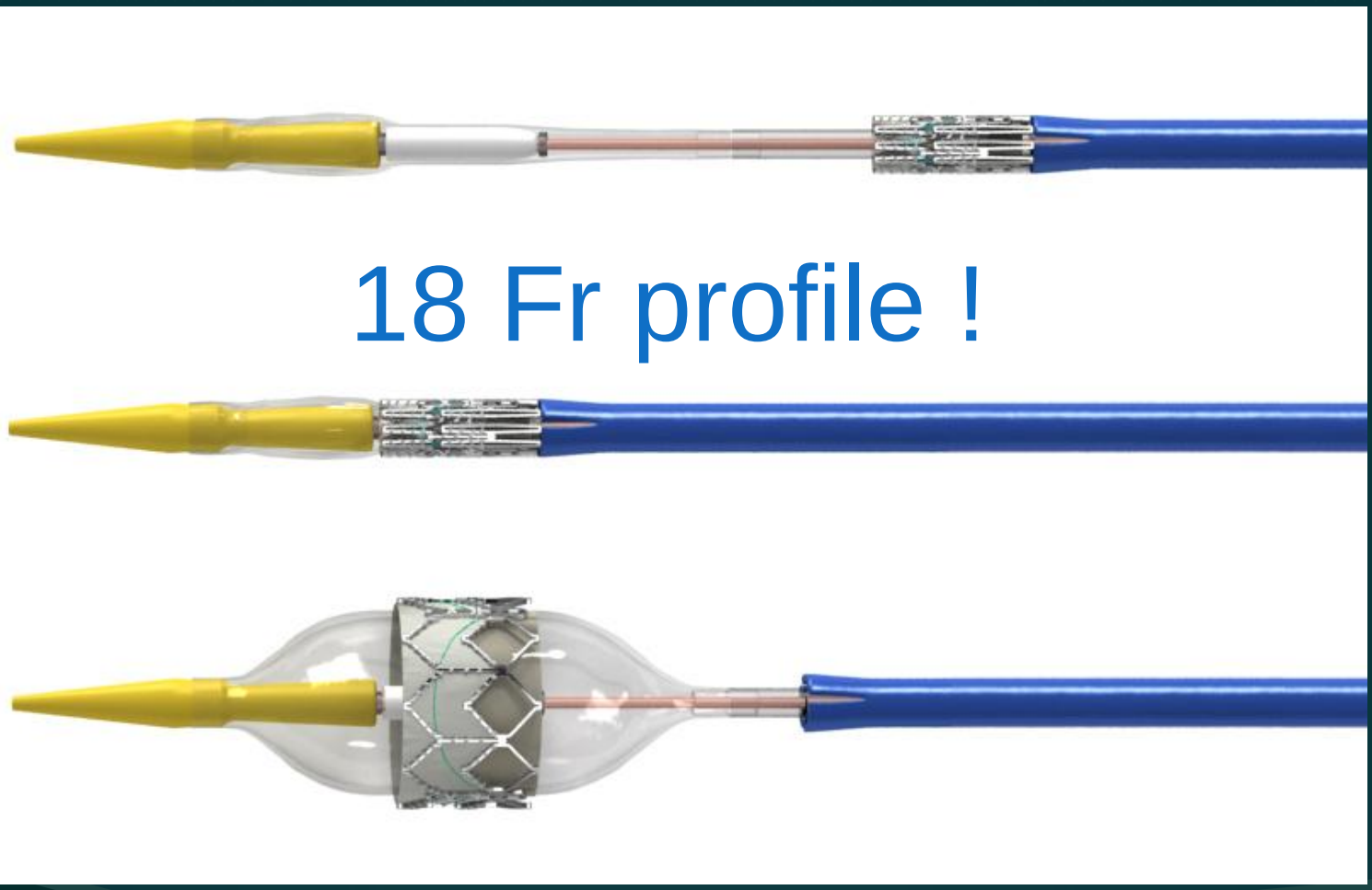
Cobalt Frame & New Leaflet Geometry



Tissue Attachment

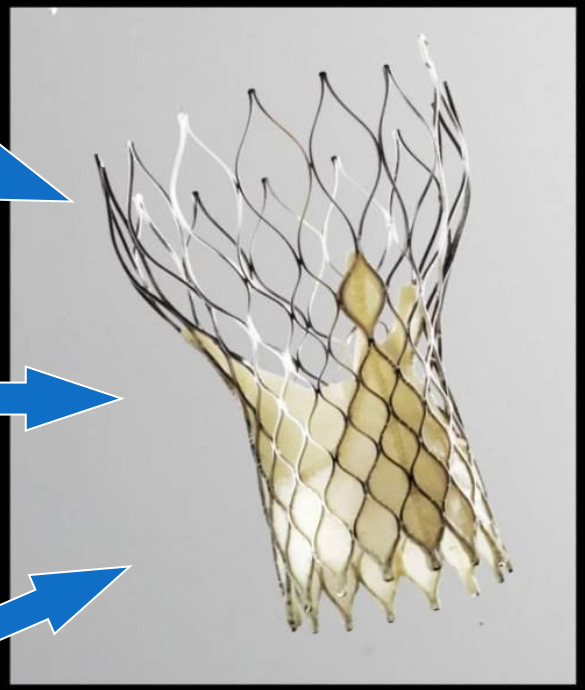
Sapien XT

Sapien XT + NovaFlex Delivery System



CoreValve Self-Expanding Aortic Bioprosthesis

- HIGHER PART: low radial force area axes the system and increases quality of anchoring
- MIDDLE PART: functional valve area with three leaflets and constrained to avoid coronaries (convexo-concave) – avoids need for rotational positioning
- LOWER PART: high radial force of the frame pushes aside the native calcified leaflets for secure anchoring and avoids recoil and para-valvular leaks



A porcine pericardial tissue valve fixed to the frame with PTFE sutures

Medtronic
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NEW TAVI TECHNOLOGIES

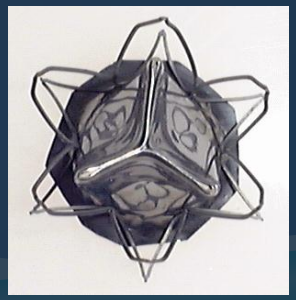
- Direct Flow
- Sadra
- AorTx
- Jena Valve
- HLT
- ABPS PercValve
- EndoTech
- Ventor Embracer
- Symetis
- others……











THANK YOU !

QUESTIONS ?