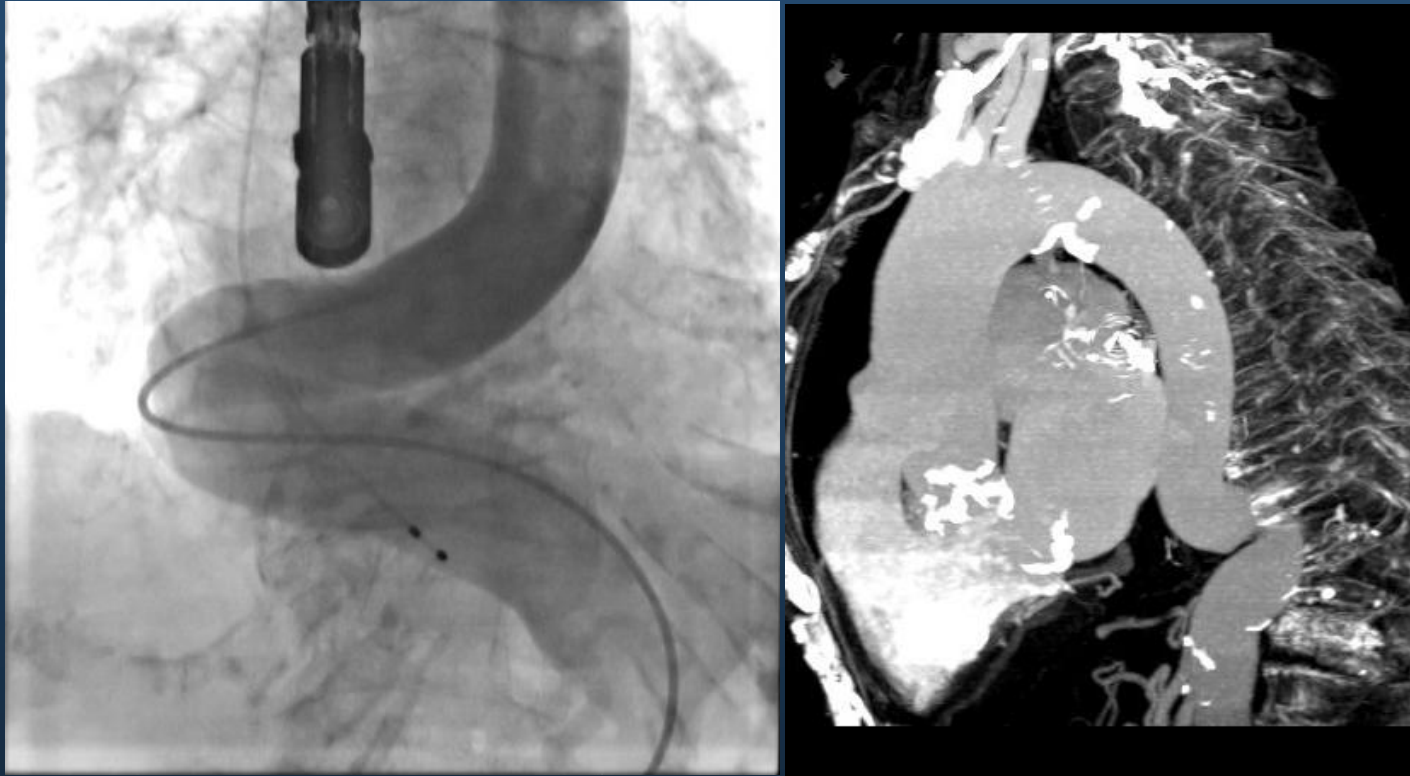


# U shaped tortuous aorta, can we perform TAVI ?



Hyo-Soo Kim, MD/PhD/FAHA

**SNU-H** (Seoul national university hospital)



Seoul National University Hospital Cardiovascular Center

# NOH K.H F/84 45498066

- 84YO Female, **141 Cm, 37.0 kg, BMI : 18.61**
- 12YA, pulmonary Tbc
- 10YA, AV stenosis, HF Dx
  - other hospital F/U
  - DOE, NYHA Fc II-III
- 1WA, DOE aggravation
  - admission d/t ADHF (other hospital)
  - EchoCG: severe AS
  - visited SNUH for 2<sup>nd</sup> opinion

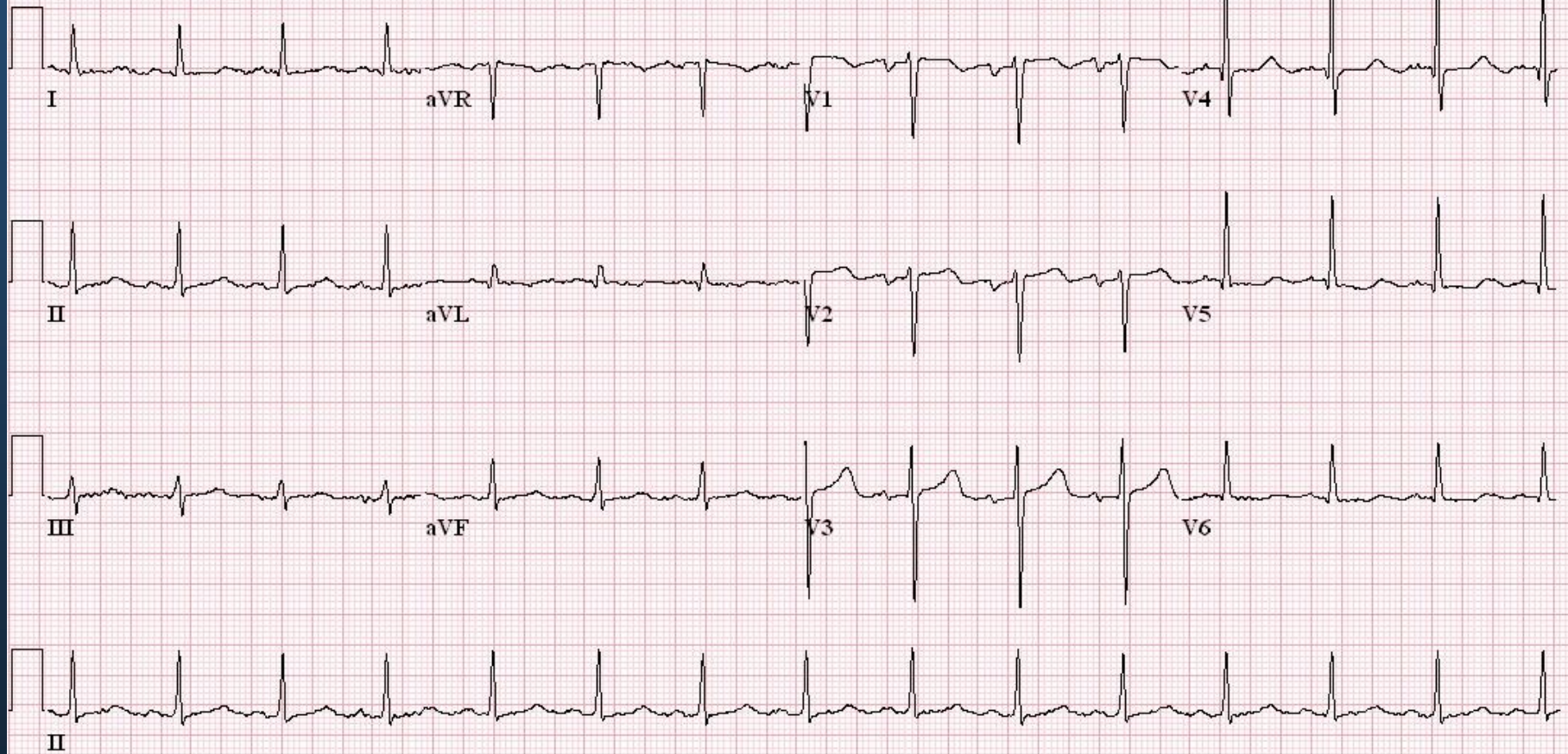


# ECG (2014-01-12)

Med:

Referred by:

Confirmed By: REPORT UNCONFIRMED

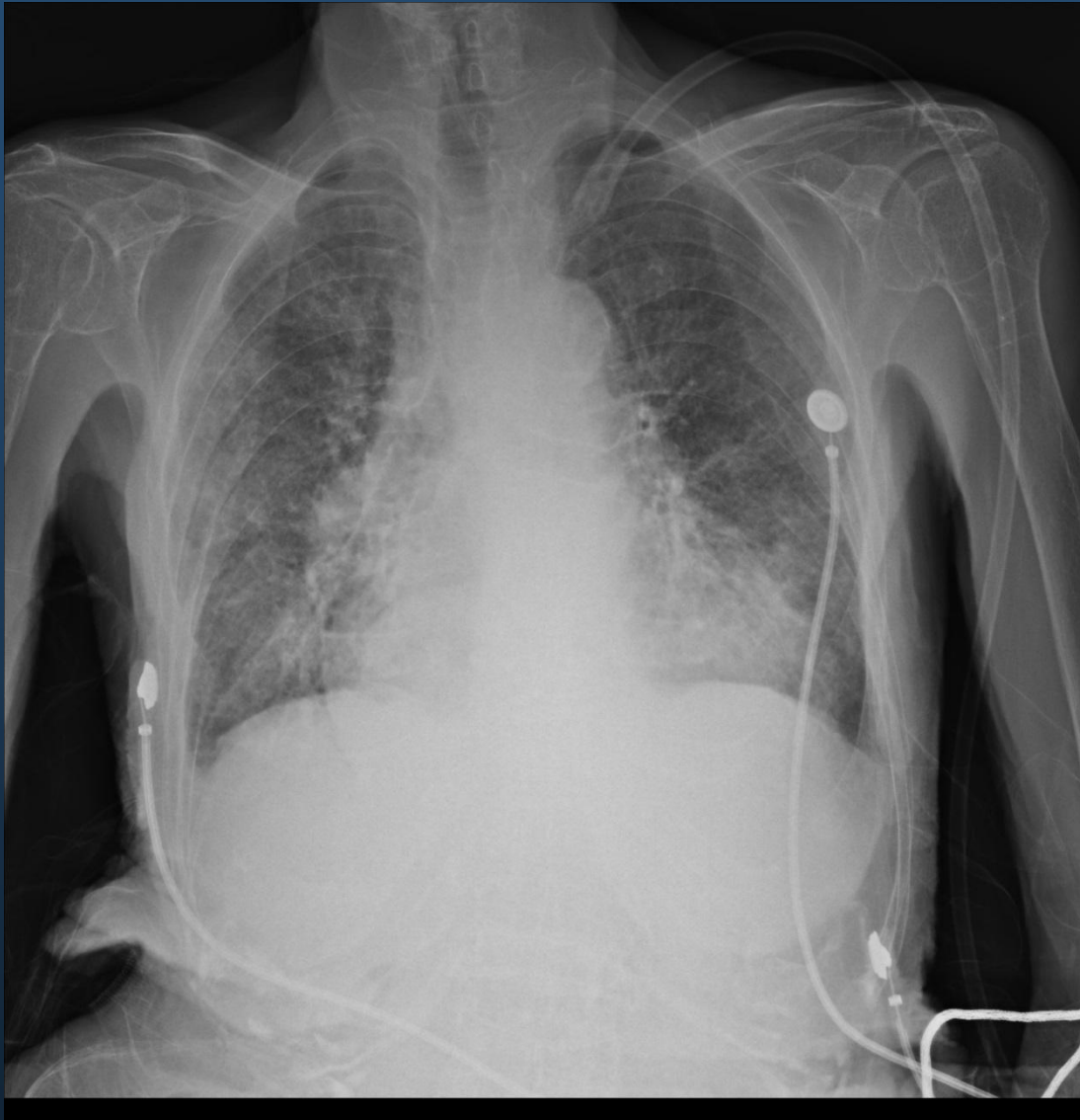


25mm/s 10mm/mV 40Hz 8.0.1 12SL 231 CID: 1

EID:14 EDT: 10:47 21-MAR-2014 ORDER:



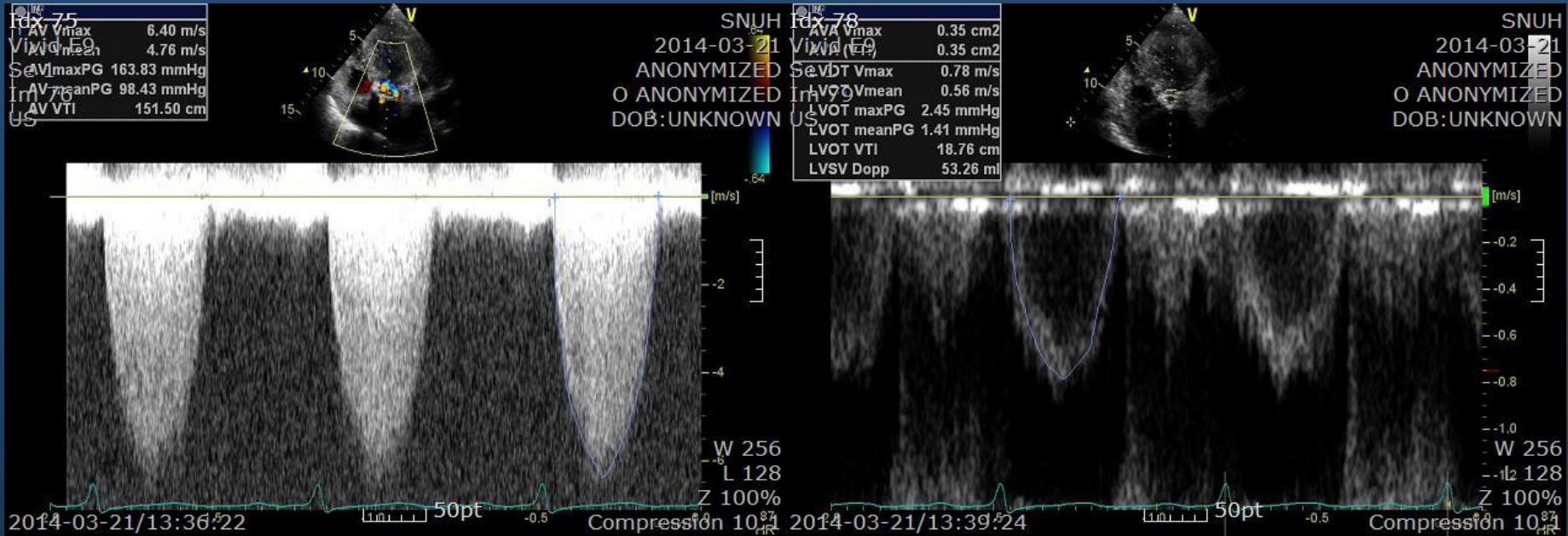
# Chest PA (2014-03-24)



[Conclusion]  
Cardiomegaly.  
Diffuse haziness on both lung field.  
- r/o pulmonary edema.



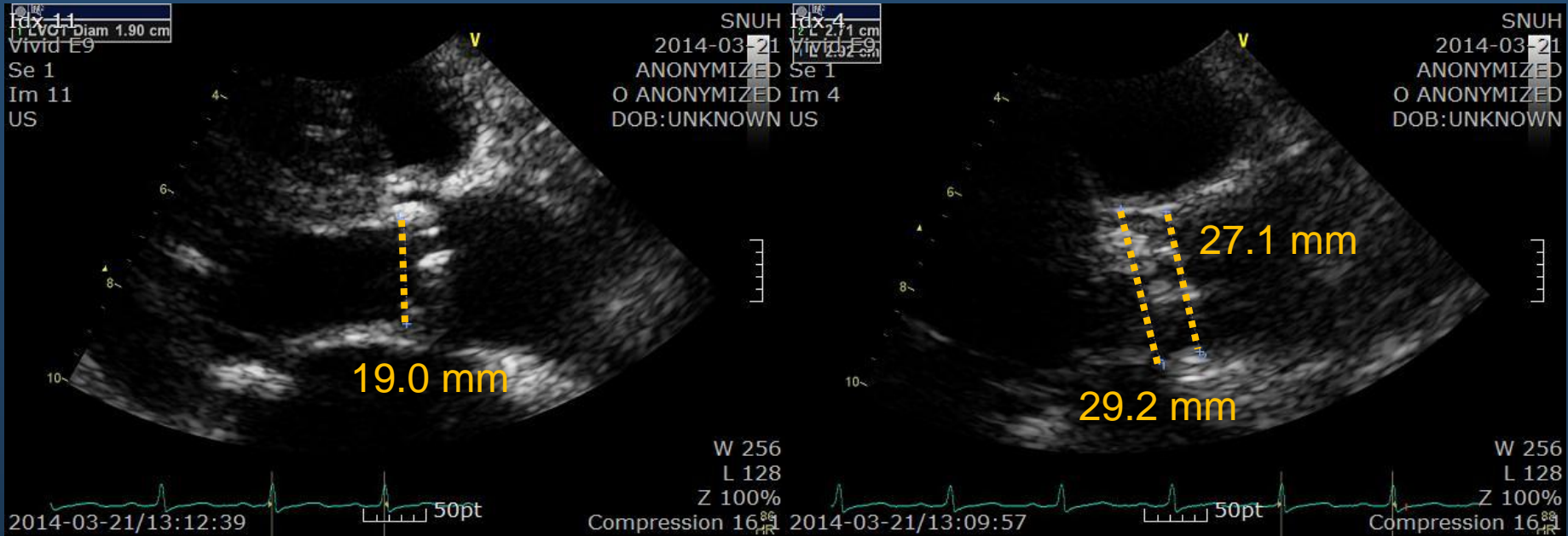
# TTE (2014-03-21)



- ✓ Severe AS
- ✓ AV mean PG = 96.8 mmHg, AV Vmax = 6.3 m/s
- ✓ AVA = 0.37 cm<sup>2</sup>
- ✓ Normal LV cavity size and systolic function, dilated LA
  - LVEDD/ESD 48/34 mm, LV EF 57%, LA size 50 mm
- ✓ Concentric LVH
- ✓ Mild resting pulmonary hypertension (PASP = 47 mmHg)



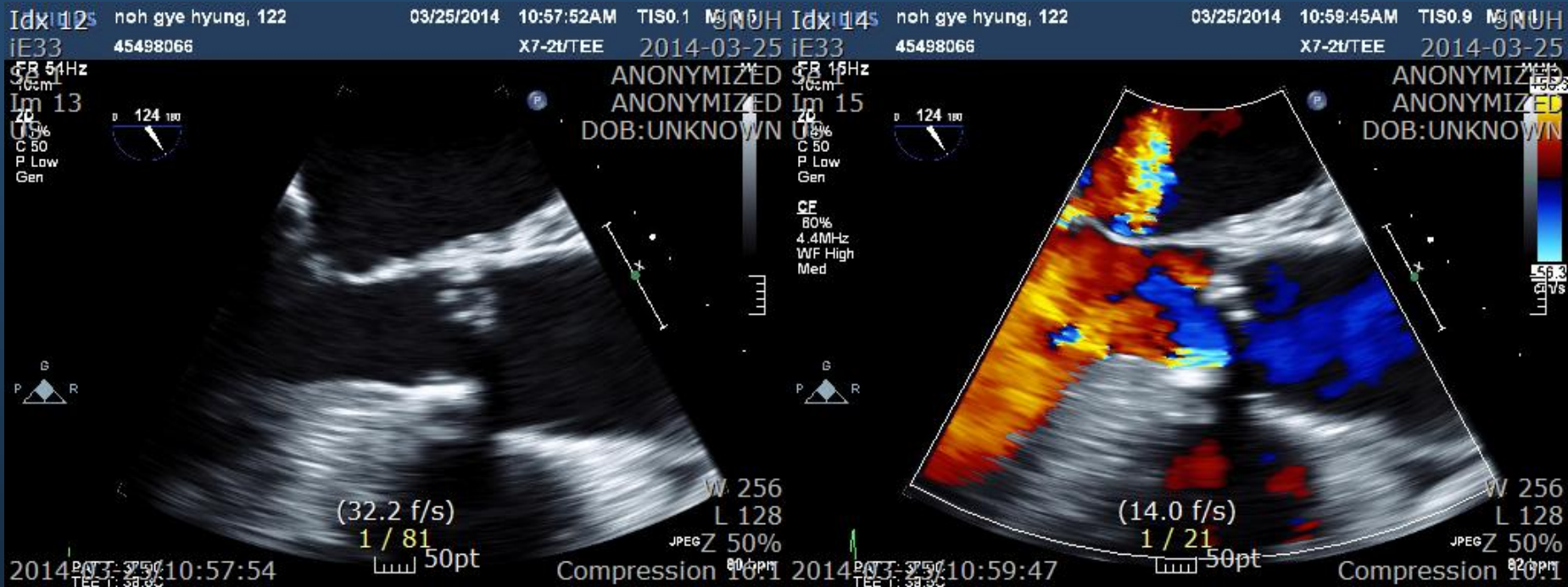
# TTE (2014-03-21)



## Diameters

- ✓ Annulus = 19.0 mm
- ✓ Sinus valsalva = 29.2 mm
- ✓ ST junction = 27.1 mm
- ✓ Ascending aorta = 37.4 mm

# TEE (2014-03-25)



# TEE (2014-03-25)



## Diameters

- ✓ Annulus = 20.0 mm
- ✓ Sinus valsalva = 31.7 mm
- ✓ ST junction = 27.6 mm





# CT angiography (pre TAVI 7 days)

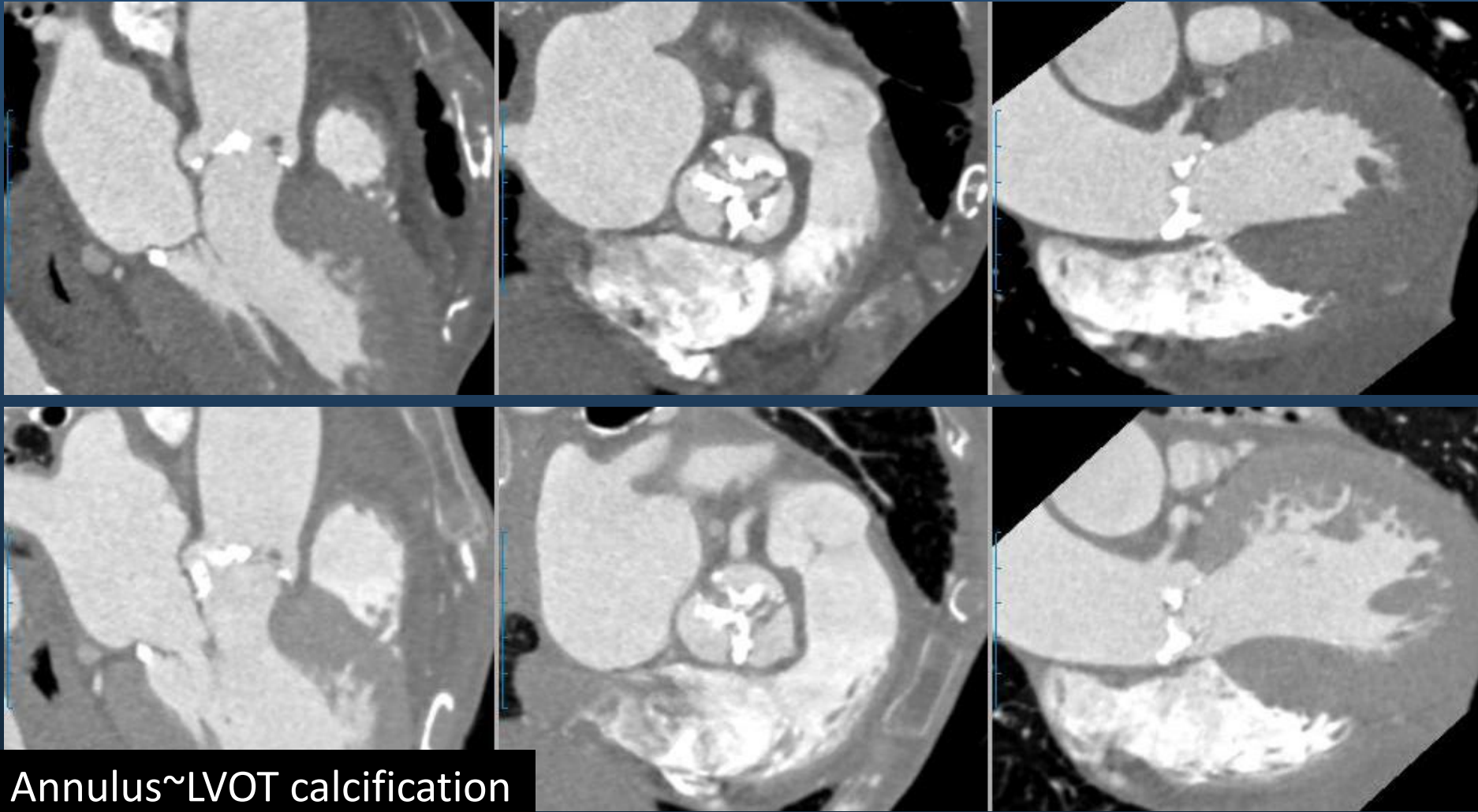


U shaped tortuous aorta



U shaped tortuous aorta

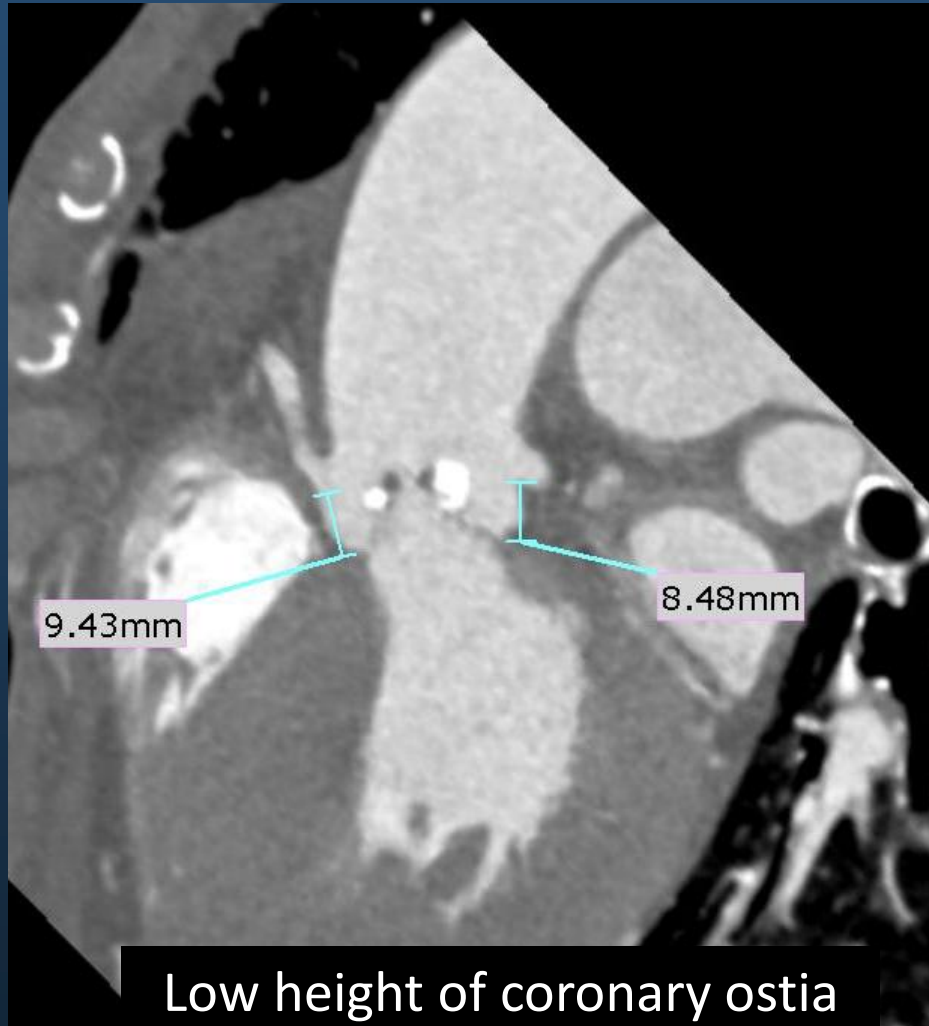
# CT angiography (pre TAVI 7 days)



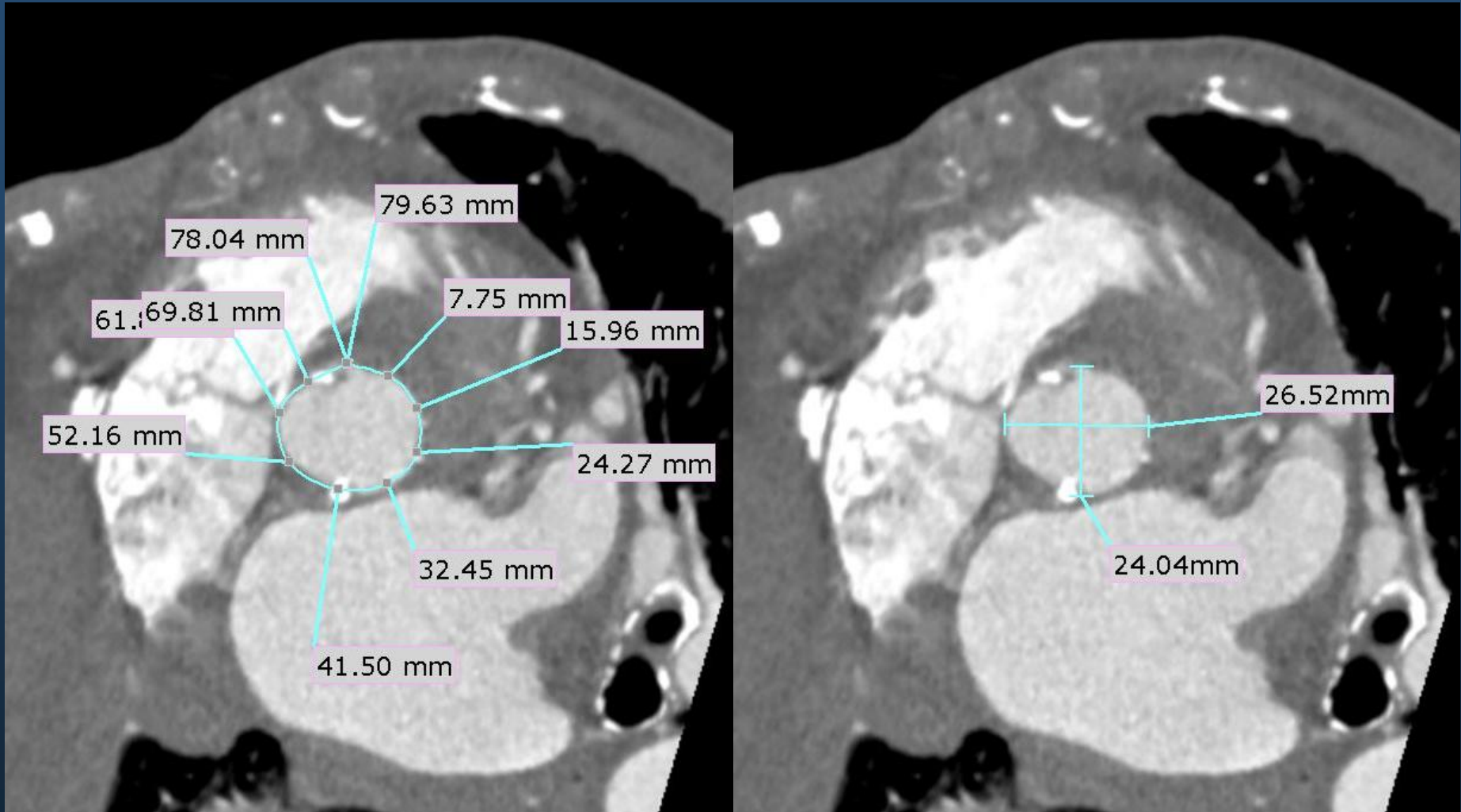
Annulus~LVOT calcification



# CT angiography (pre TAVI 7 days)



# CT angiography (pre TAVI 7 days)



# Measurements of dimensions (SNUH)

	TTE	TEE	CTCA
LVOT	19.0		
Annulus	19.0	20.0	26.52*24.04
Sinus of Valsalva	29.2	31.0	31.5
Sinotubular Jxn.	27.1	27.6	28.6
Annulus to coronary Os.			Rt 9.4 / Lt 8.5
Ascending aorta	37.4		36.4



# Measurements of dimensions

## SNUH

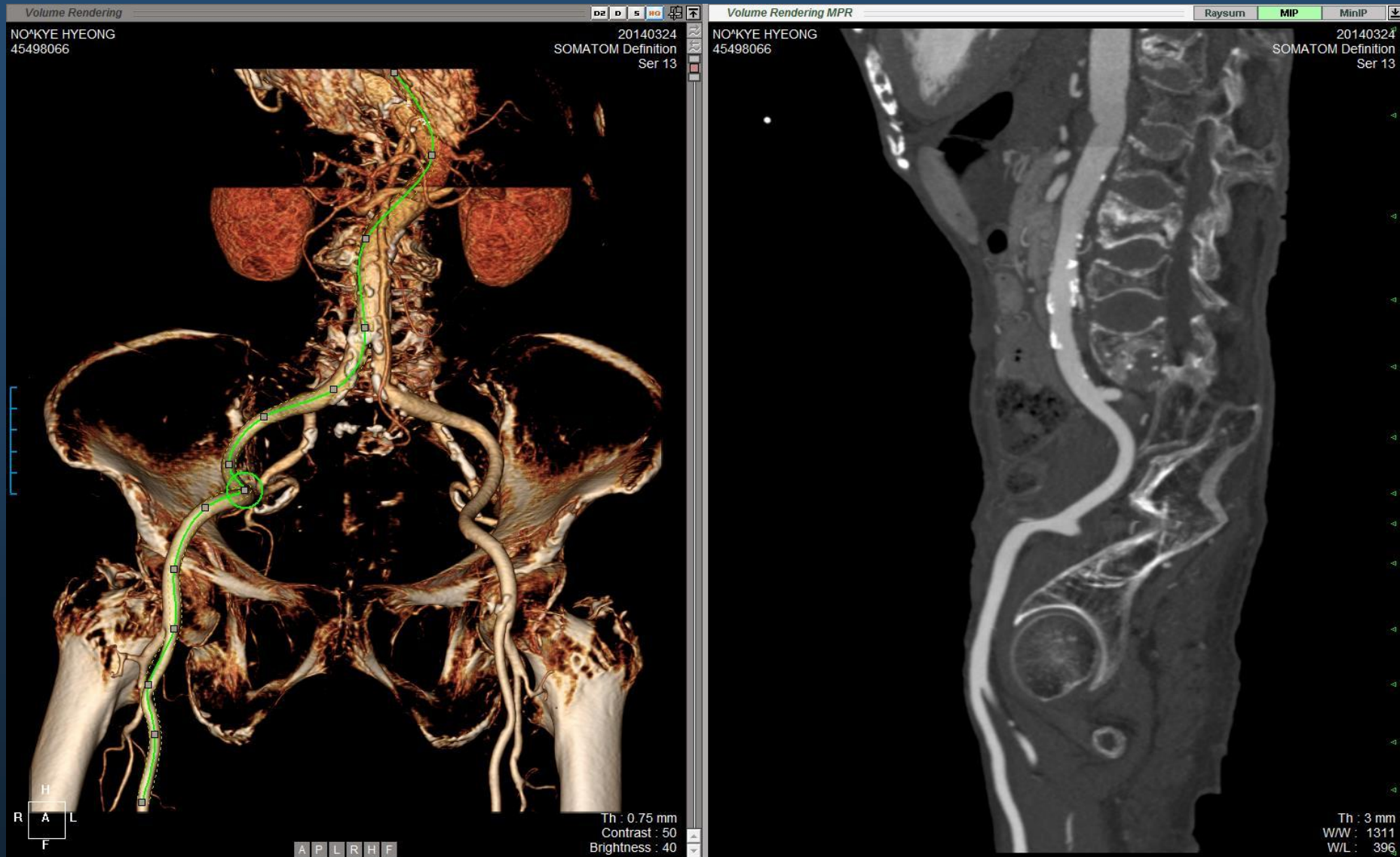
- Perimeter = 79.6 mm (29mm CORE-VALVE)
- Stretch index (29mm valve) =  $91.1/79.6 = 1.14$

## Medtronic

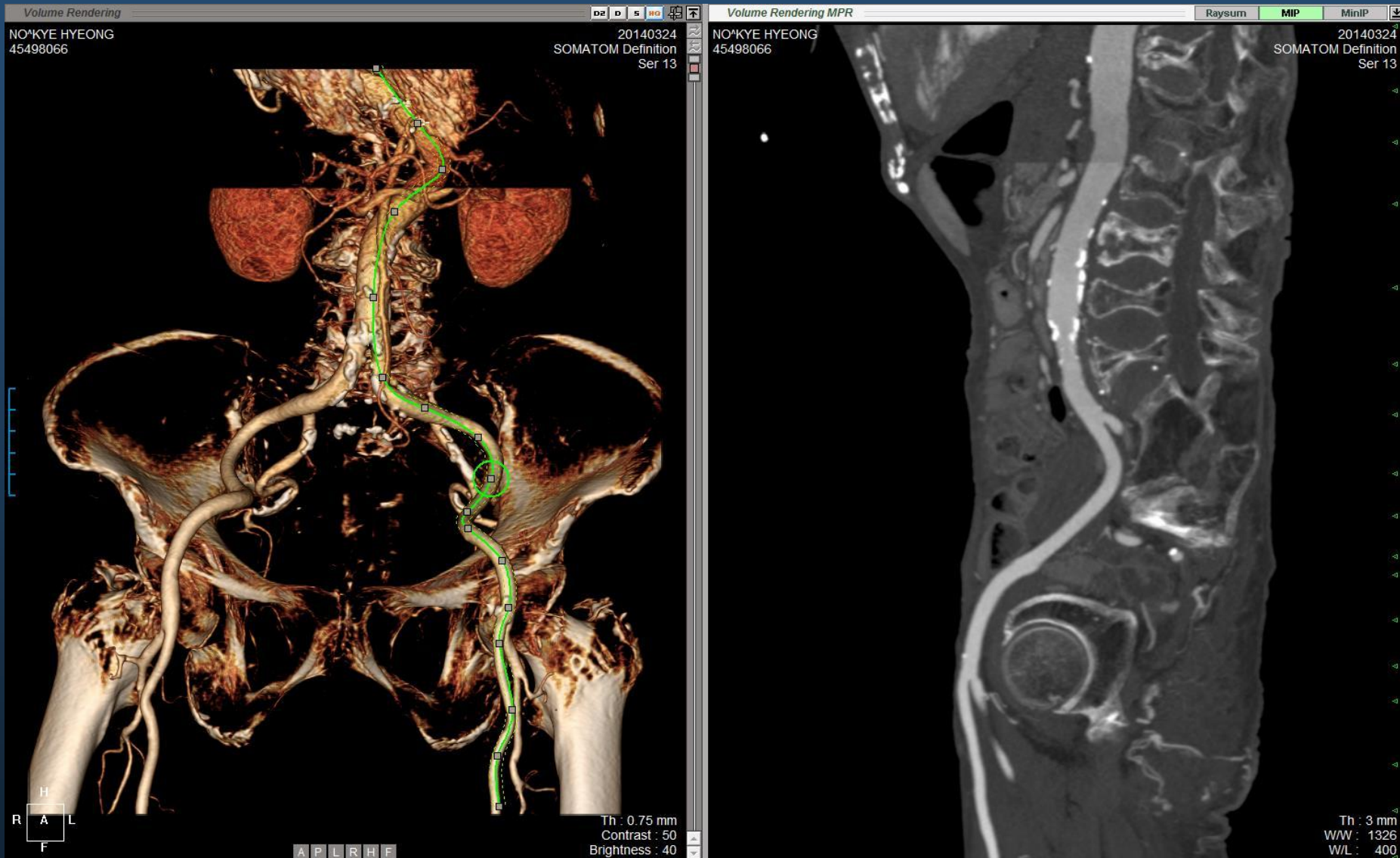
- Perimeter = 75.0 mm
- Stretch index (29mm valve) =  $91.1/75.0 = 1.21$
- Stretch index (26mm valve) =  $81.6/75.0 = 1.09$



# CT angiography (pre TAVI 7 days)

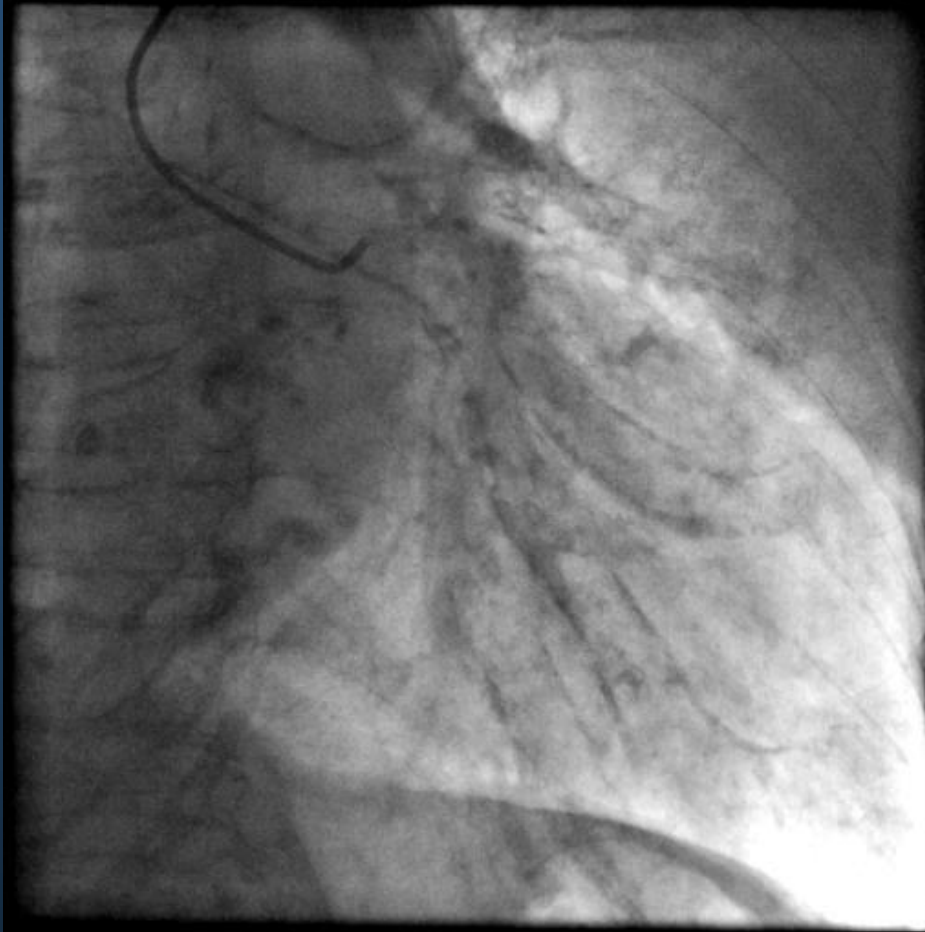


# CT angiography (pre TAVI 7 days)





# Coronary angiography (2014-03-20)



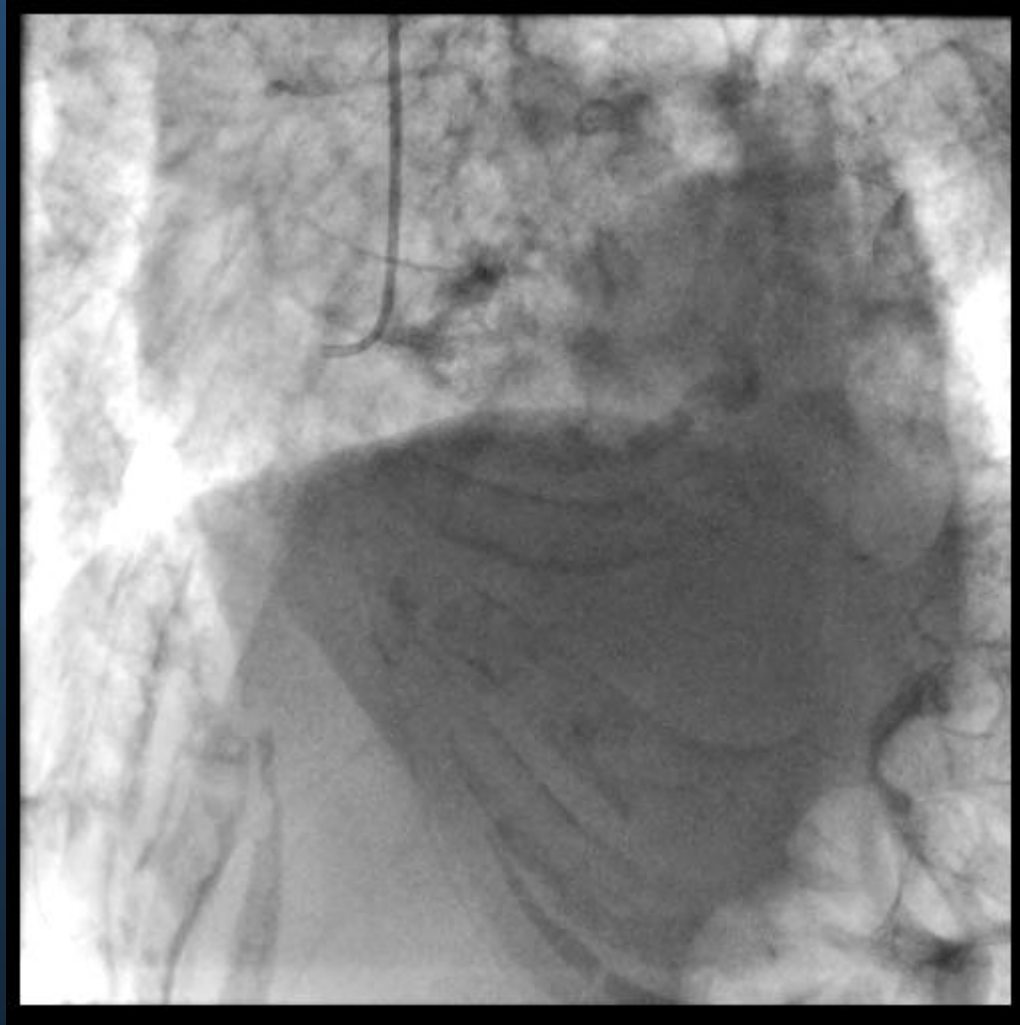
RAO - Caudal view of LCA



AP - Cranial view of LCA



# Coronary angiography (2014-03-20)



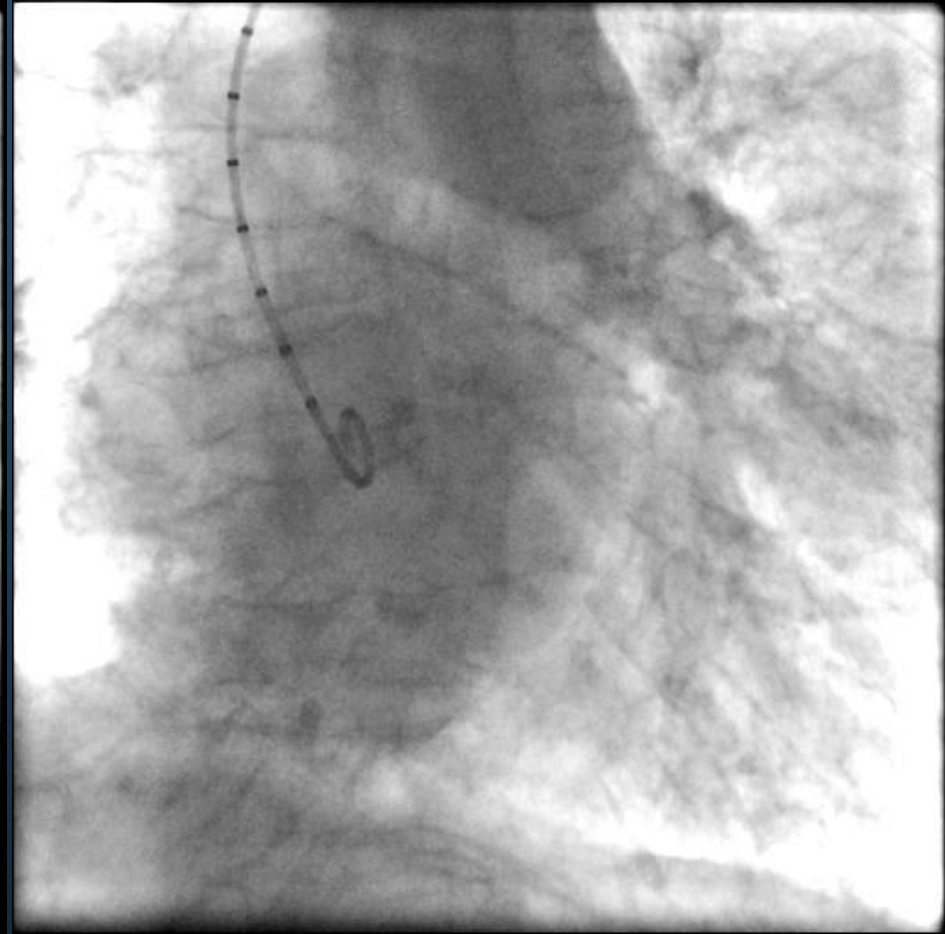
AP Cranial view of RCA



# Root aortography (2014-03-20)



AP View



RAO 15 Caudal 20 View



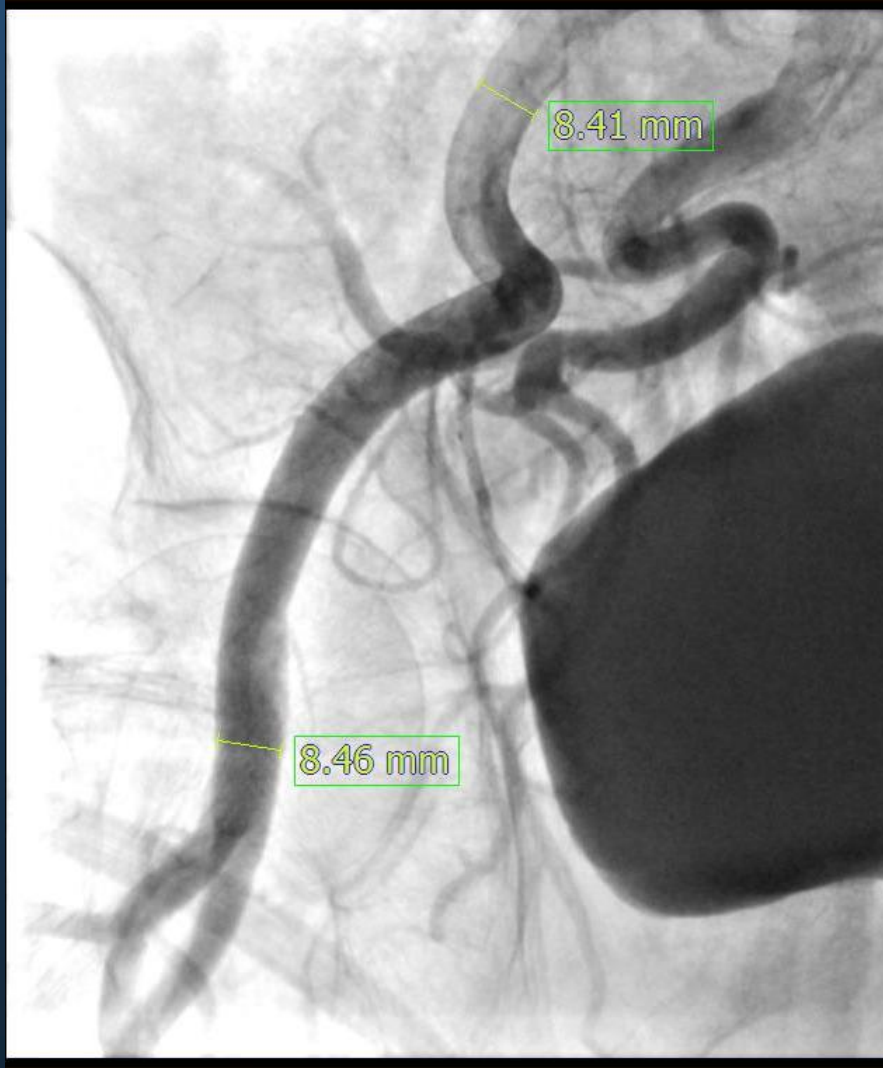
# Root aortography (2014-03-20)



RAO 15 Caudal 30 View



# Peripheral angiography (2014-03-20)

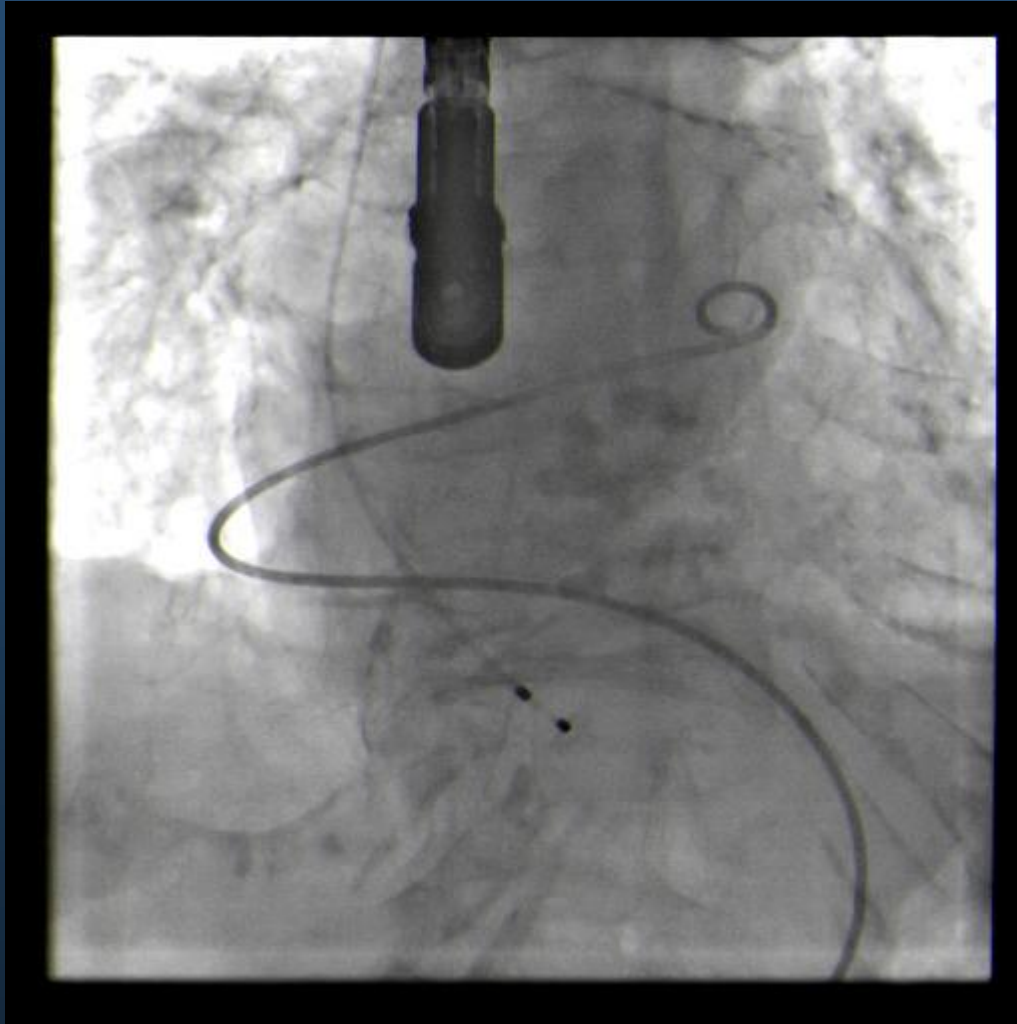


Rt. iliac artery



Lt. iliac artery

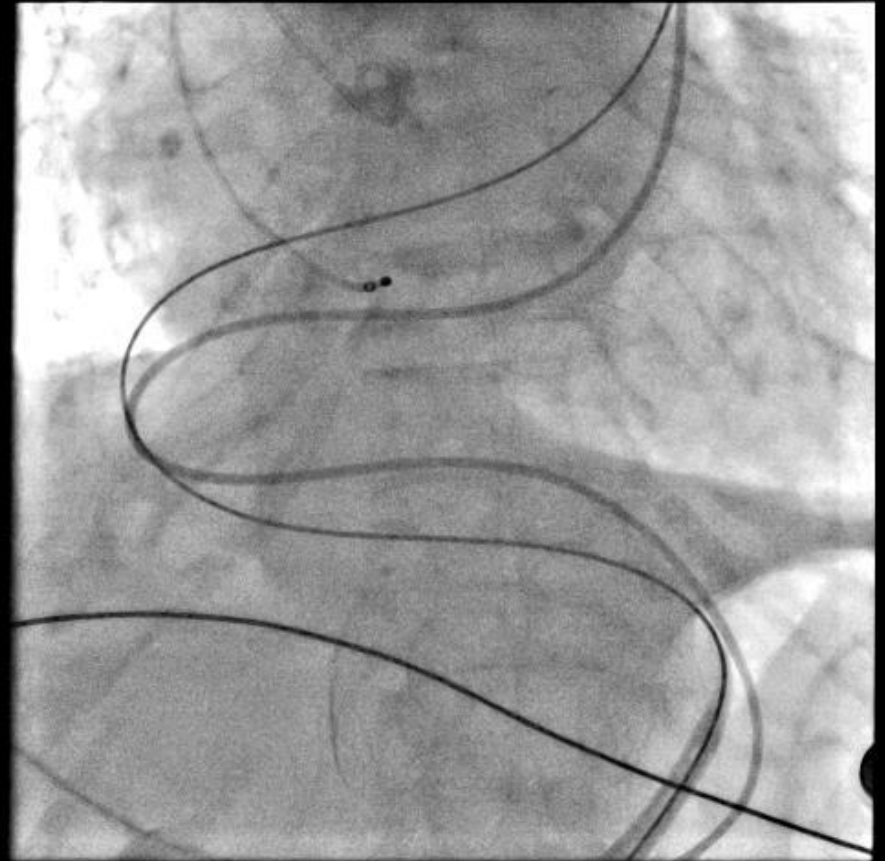
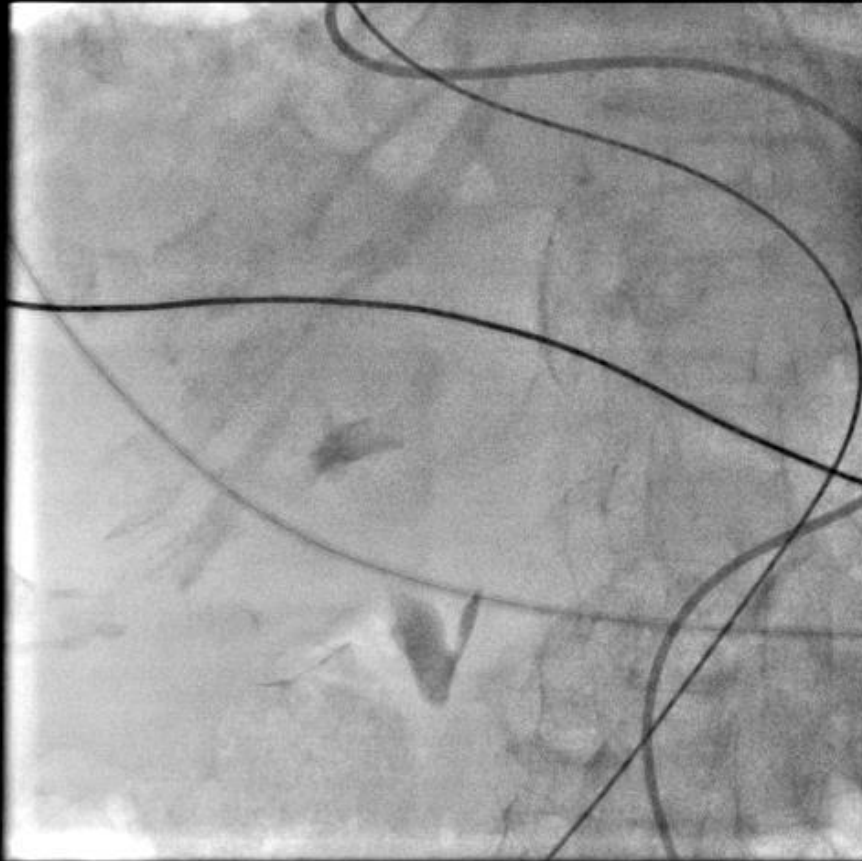
# TAVI procedure (2014-03-28)



Pre Aorto - graphy



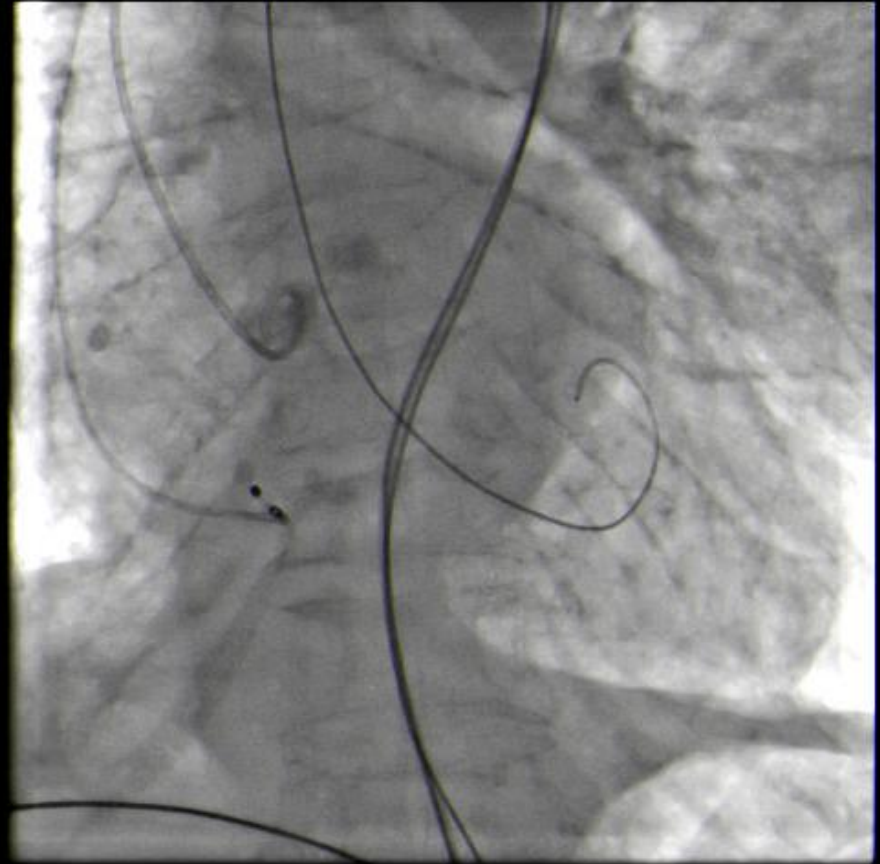
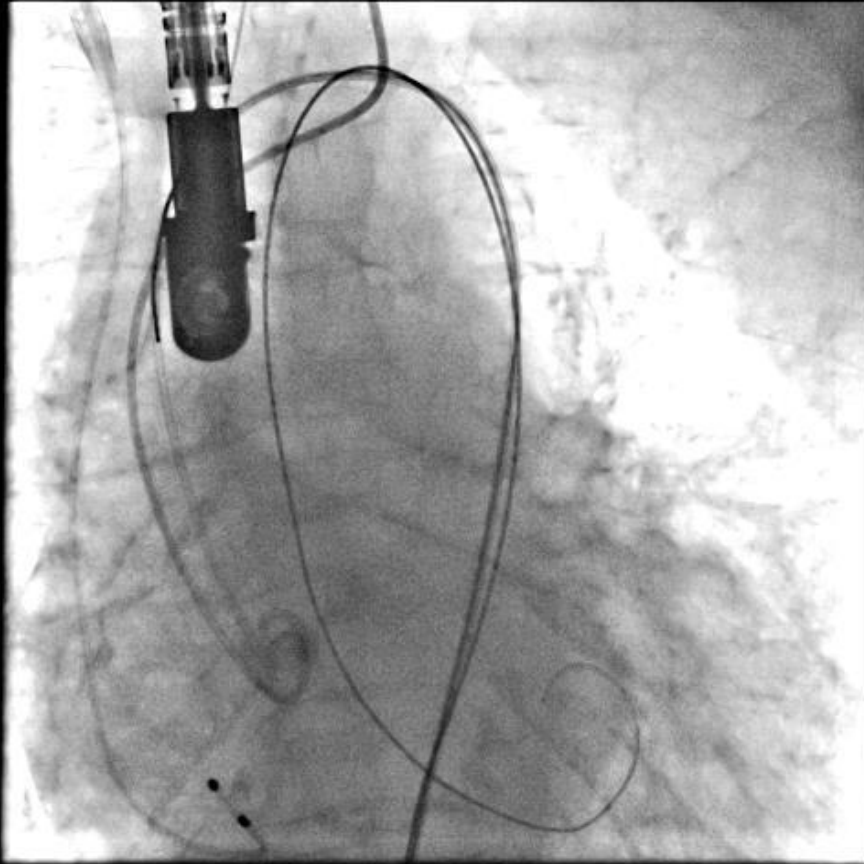
# TAVI procedure (2014-03-28)



Push Ultimum 18Fr. Sheath with A' super stiff wire  
Very difficult d/t tortuous aorta  
Impossible to advance balloon catheter



# TAVI procedure (2014-03-28)

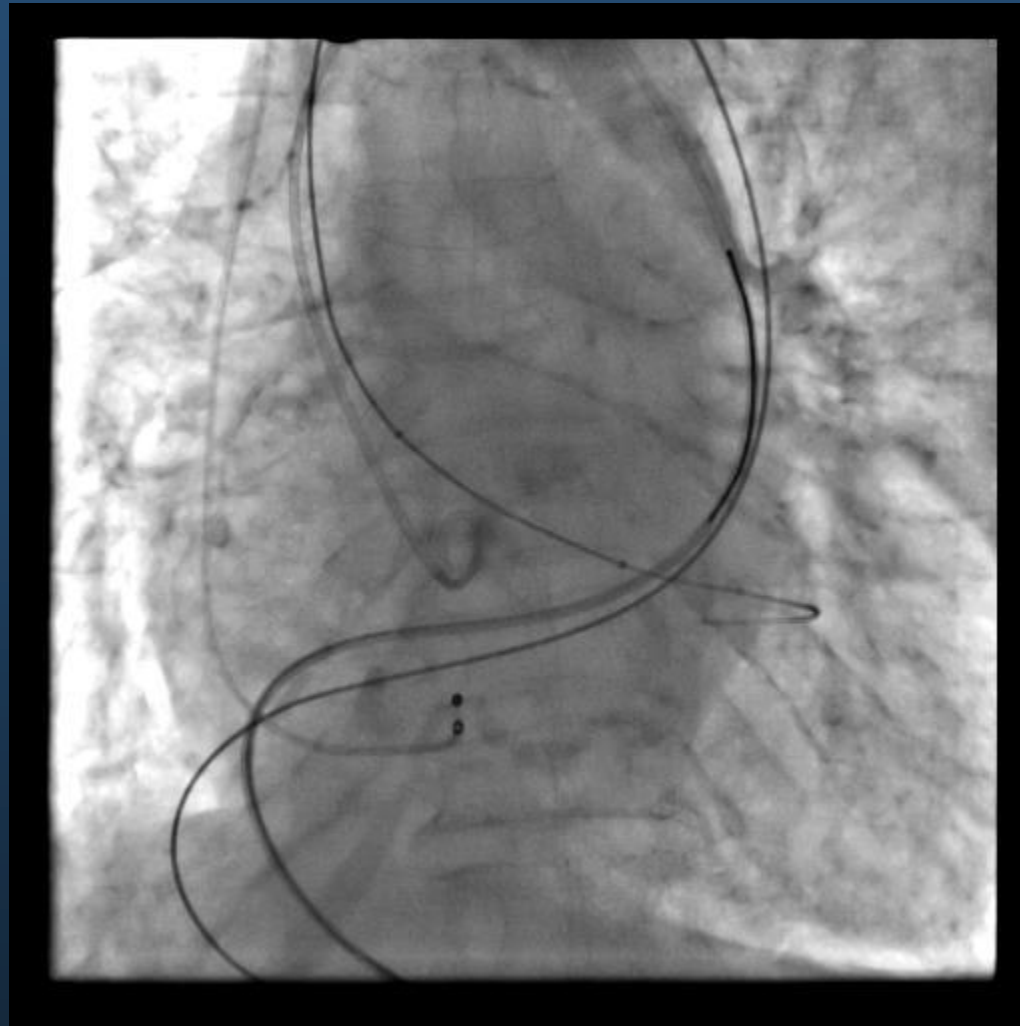


**Straighten tortuous aorta with additional stiff wire as Lunderquist wire  
Possible to advance balloon catheter**





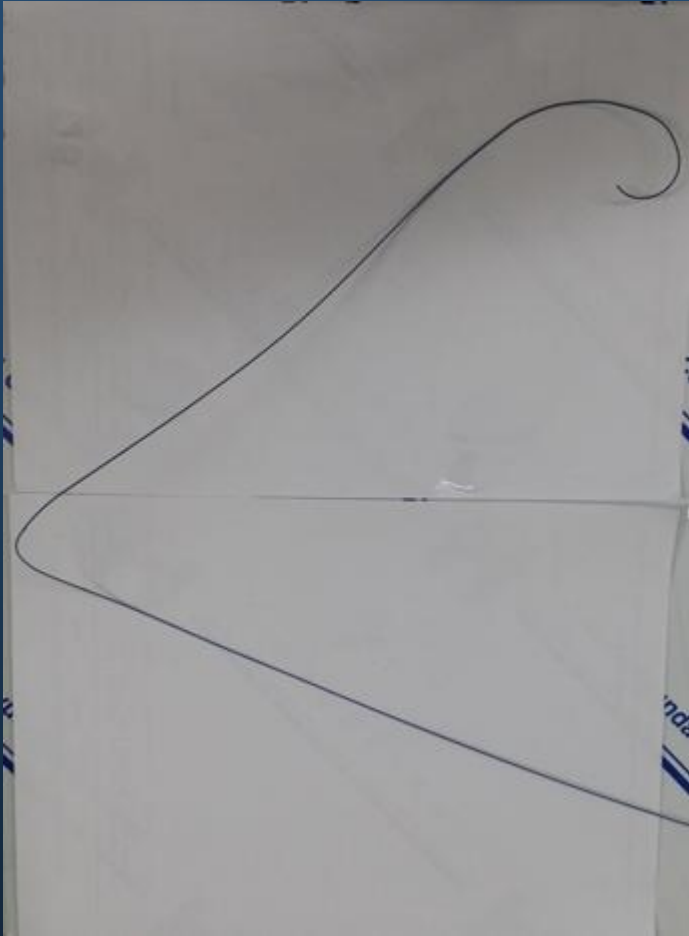
# TAVI procedure (2014-03-28)



**BAV by Numed (20\*40)**



# TAVI procedure (2014-03-28)



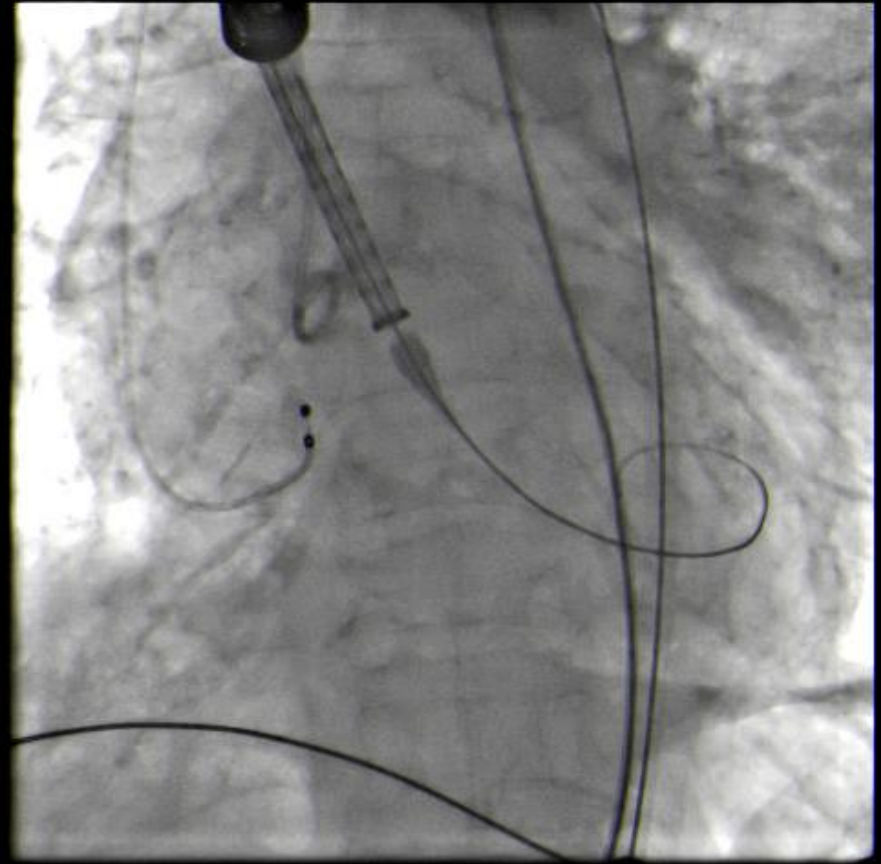
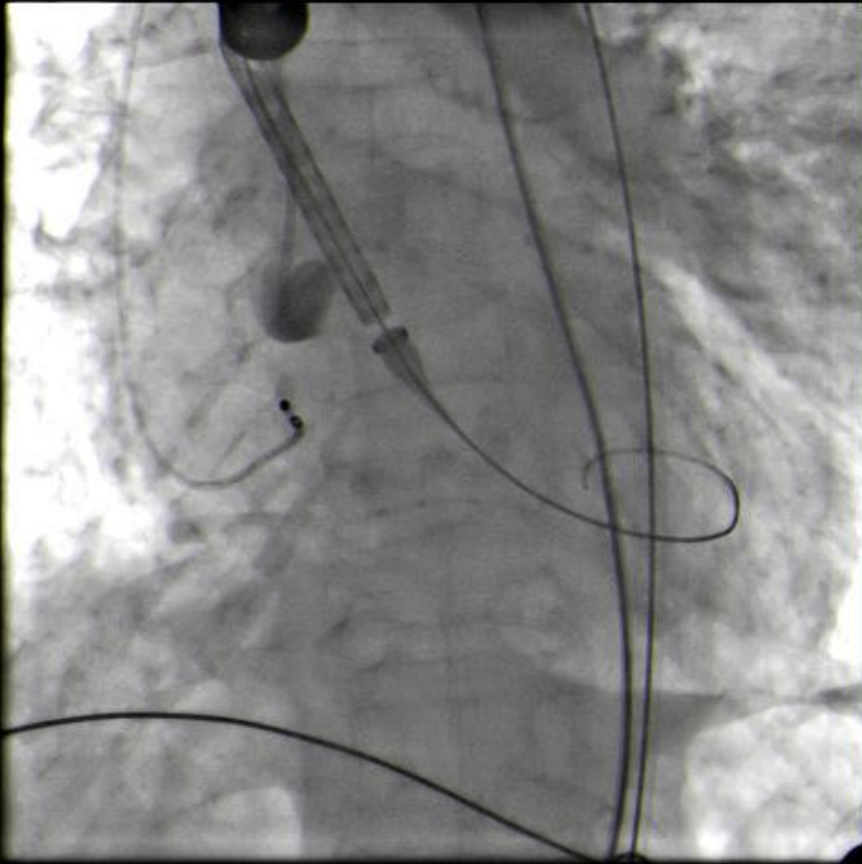
After BAV, it was impossible to advance valve through aorta.

When we checked Lunderquist wire, it was deformed.

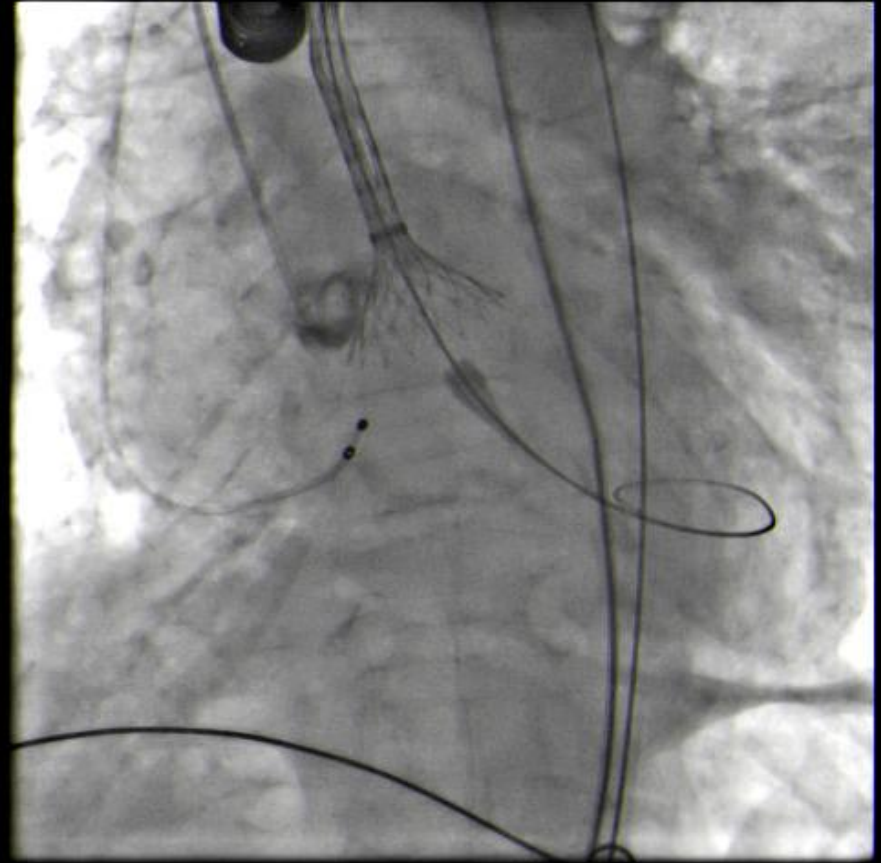
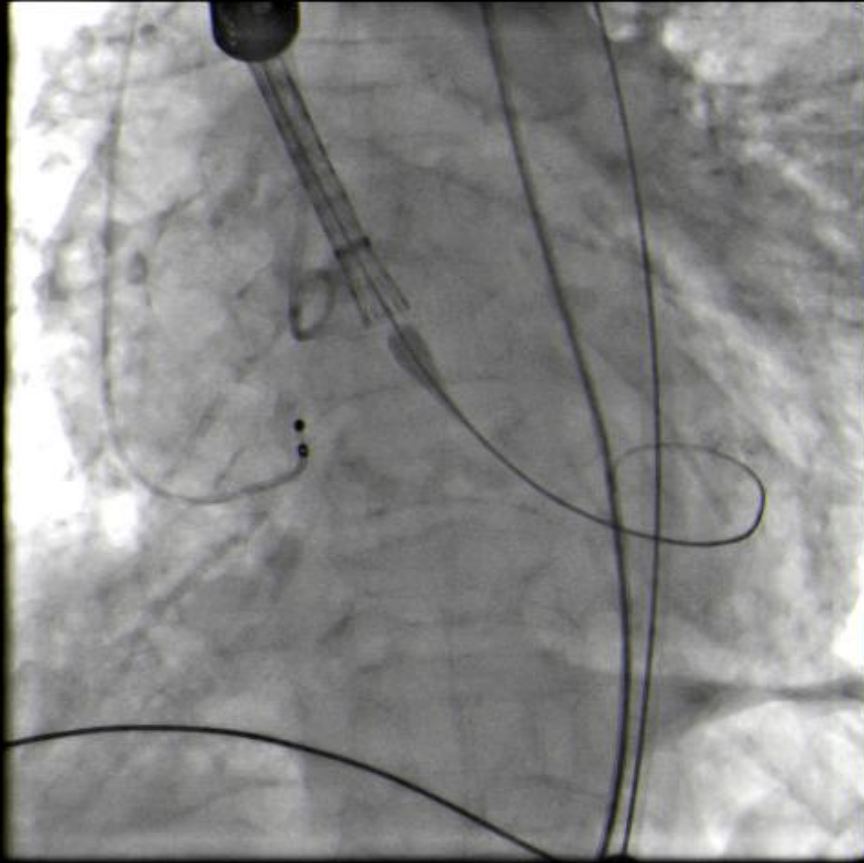
After replacing it with new L' wire, it was possible to advance valve.

# TAVI procedure (2014-03-28)

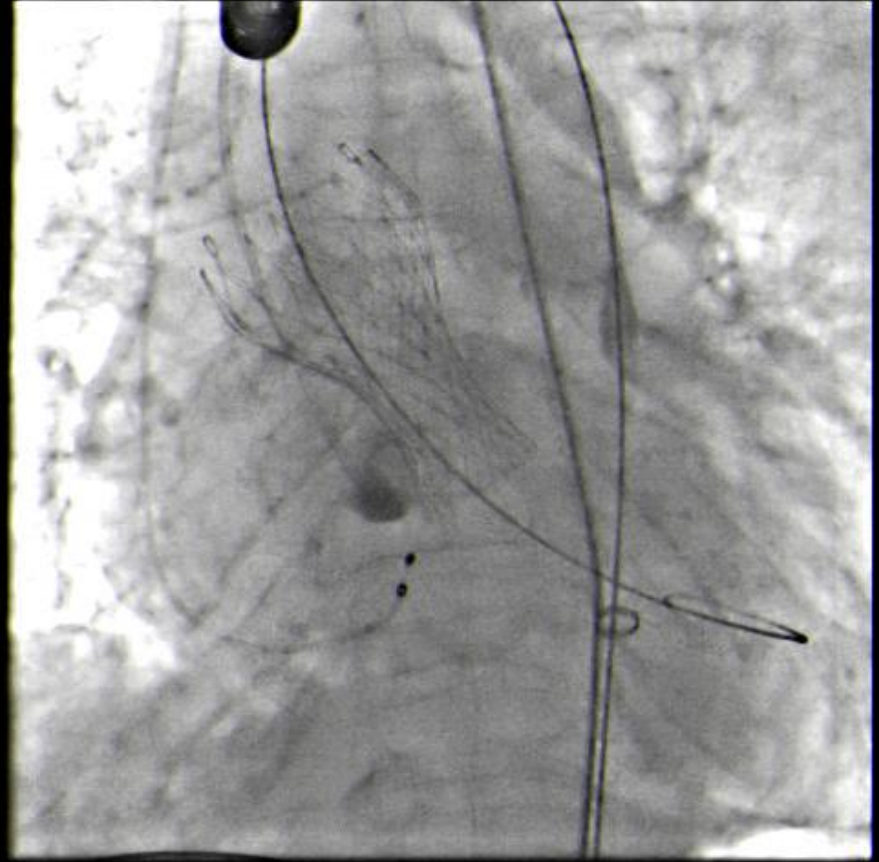
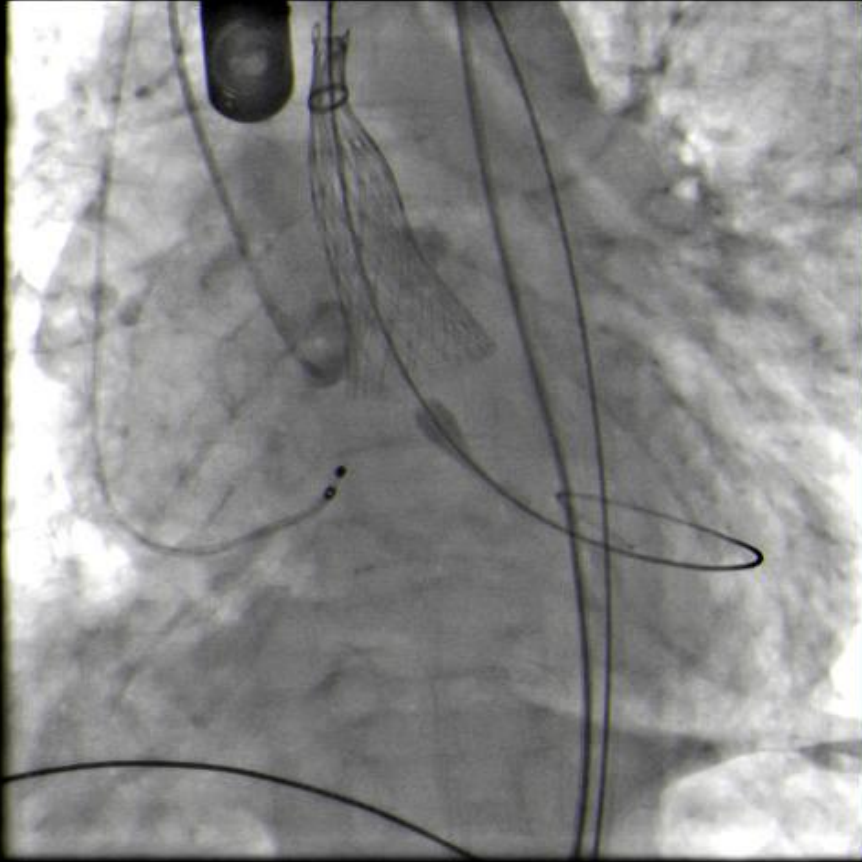
Delivery of valve under the additional support of L' -wire



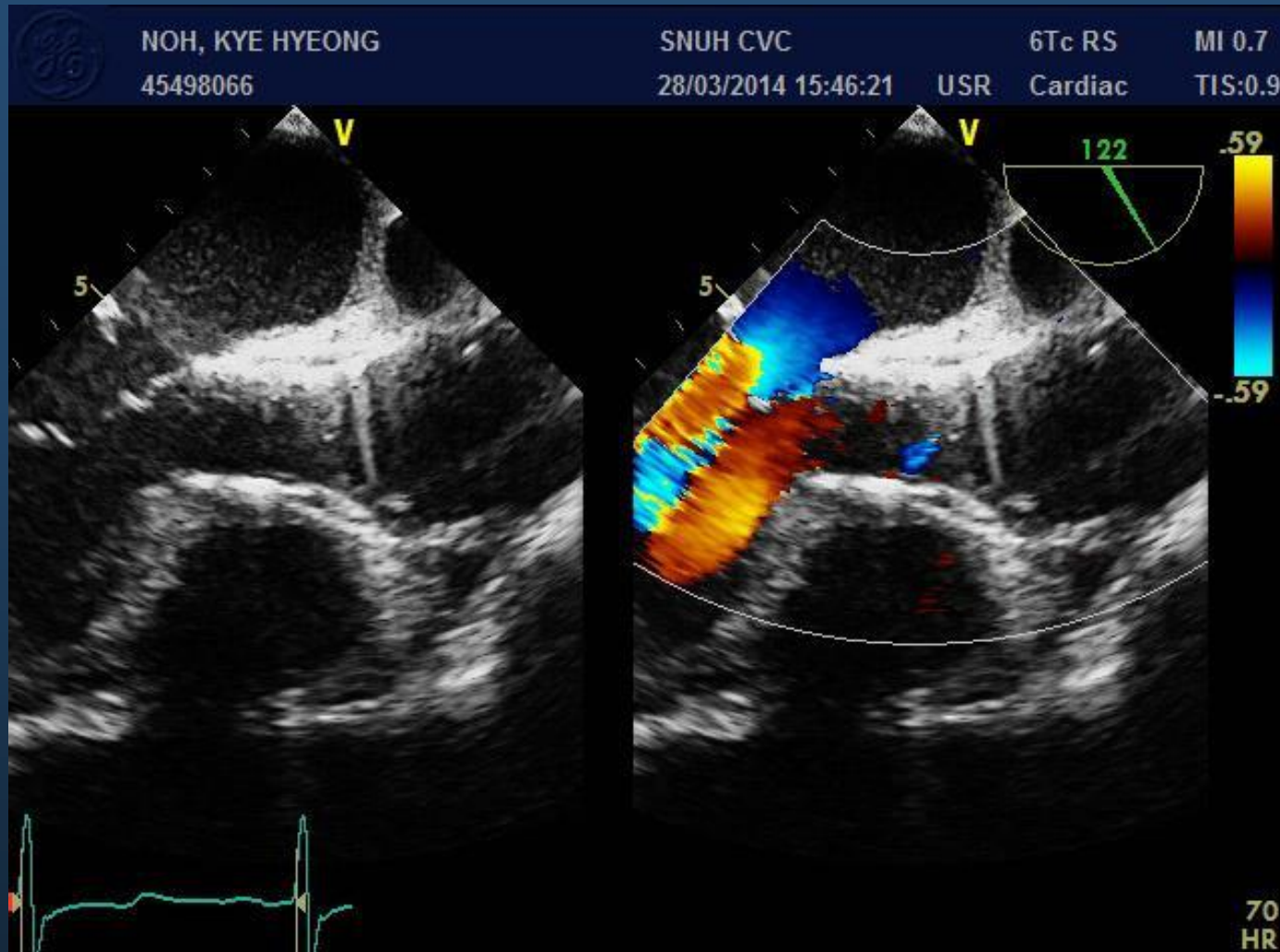
# TAVI procedure (2014-03-28)



# TAVI procedure (2014-03-28)



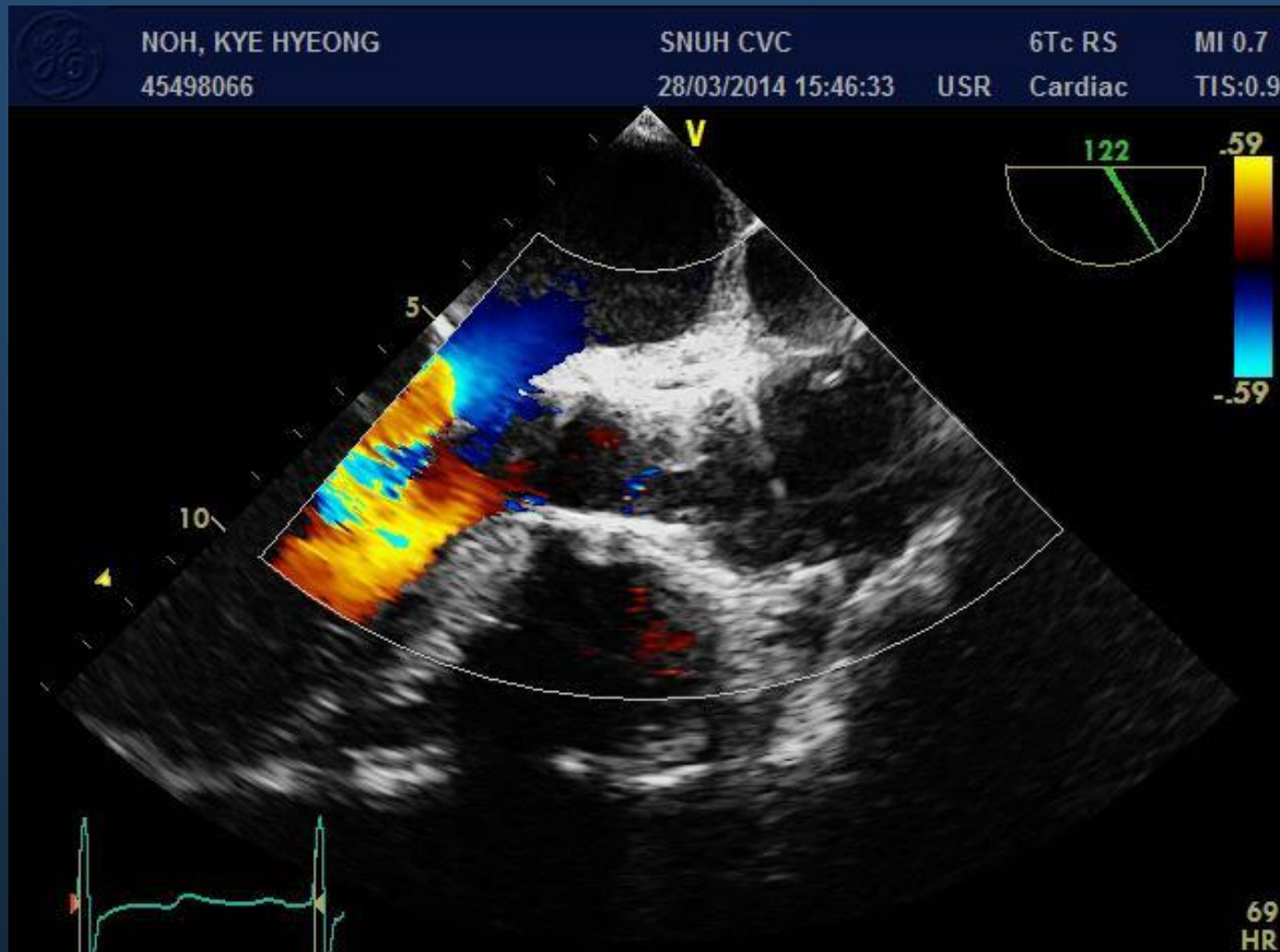
# TAVI procedure (2014-03-28)



Post Stenting TEE – Long axial view



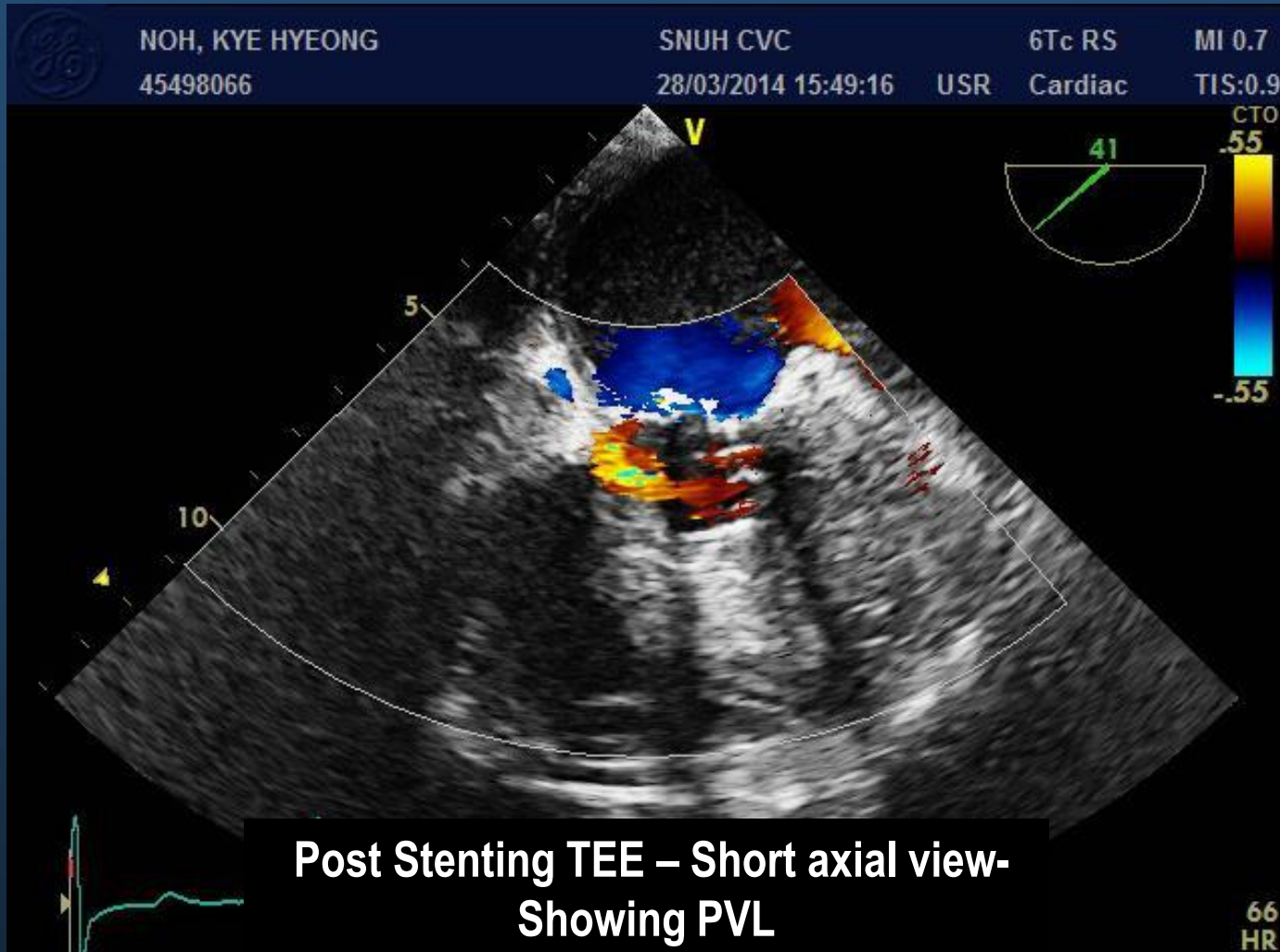
# TAVI procedure (2014-03-28)



Post Stenting TEE – Long axial view

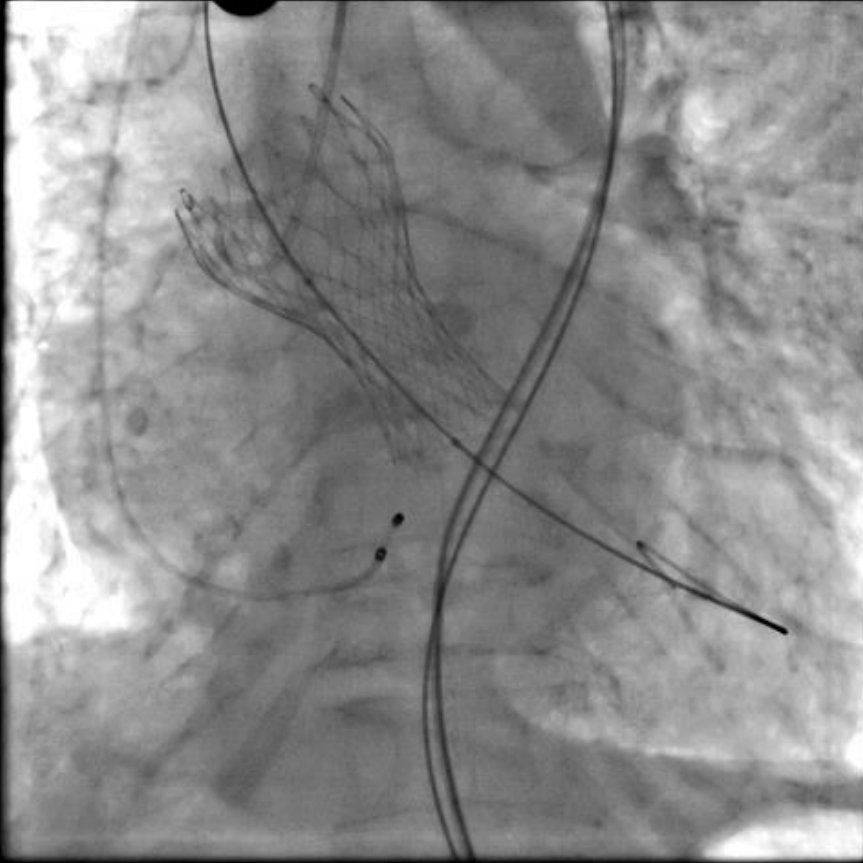


# TAVI procedure (2014-03-28)

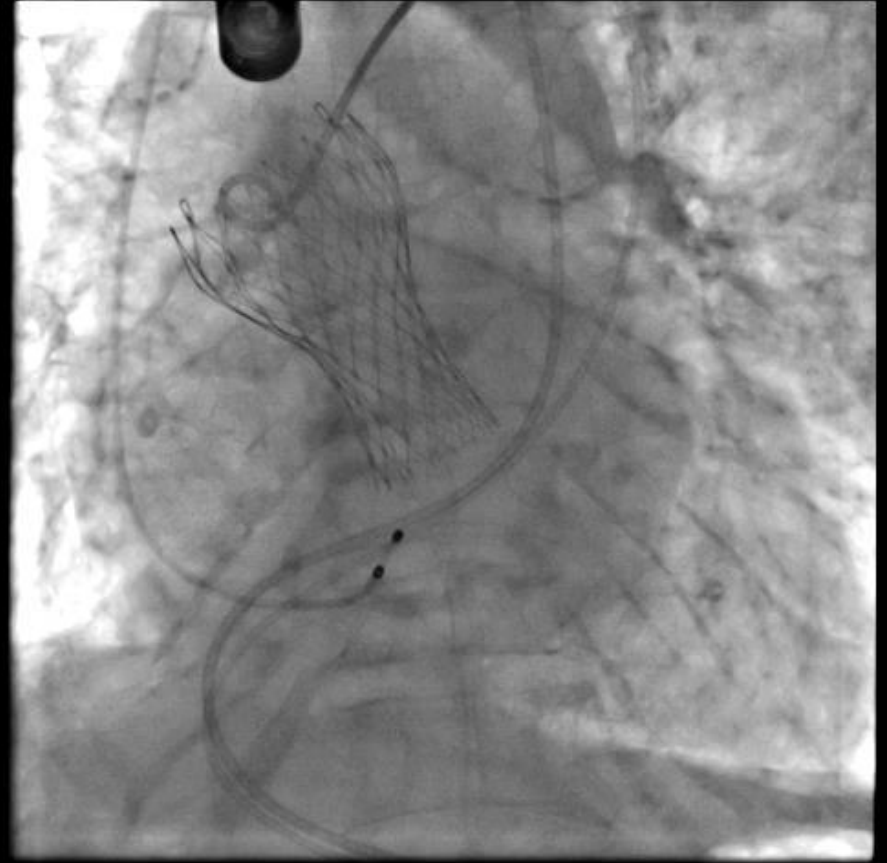




# TAVI procedure (2014-03-28)



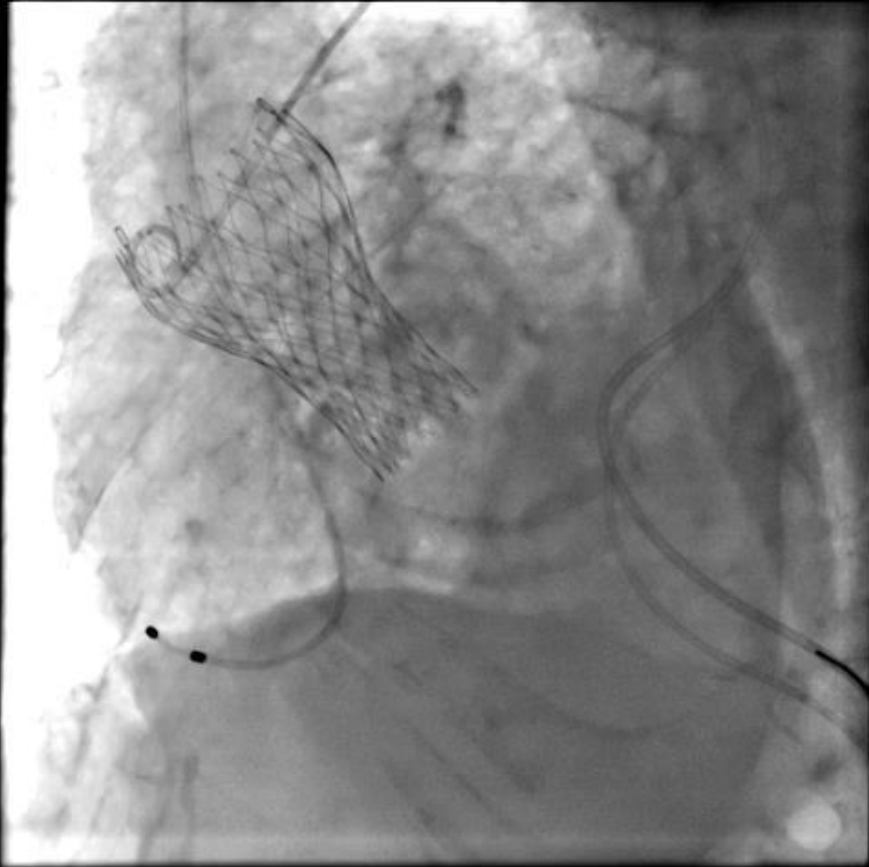
**Post Ballooning (23\*40)**



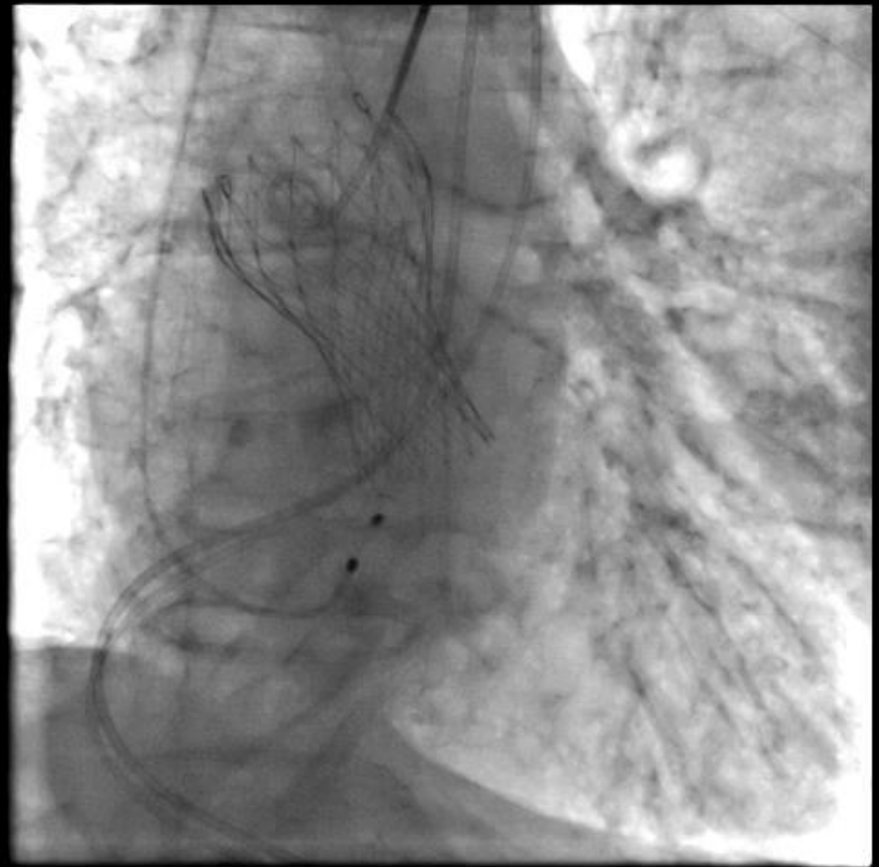
**Final Aorto – graphy  
(RAO 10 CAU 30)**



# TAVI procedure (2014-03-28)



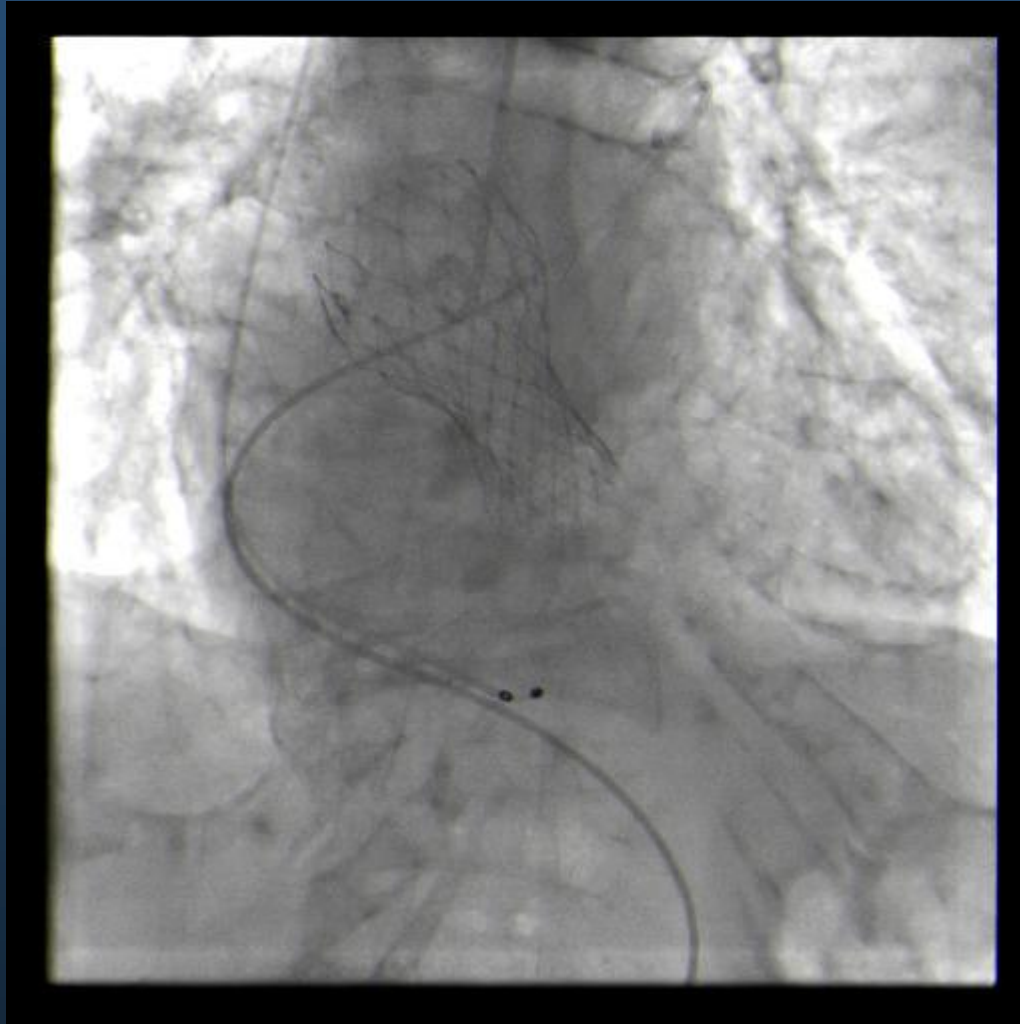
**Final Aorto – graphy  
(LAO 30 CAU 5)**



**Final Aorto – graphy  
(RAO 25 CAU 25)**



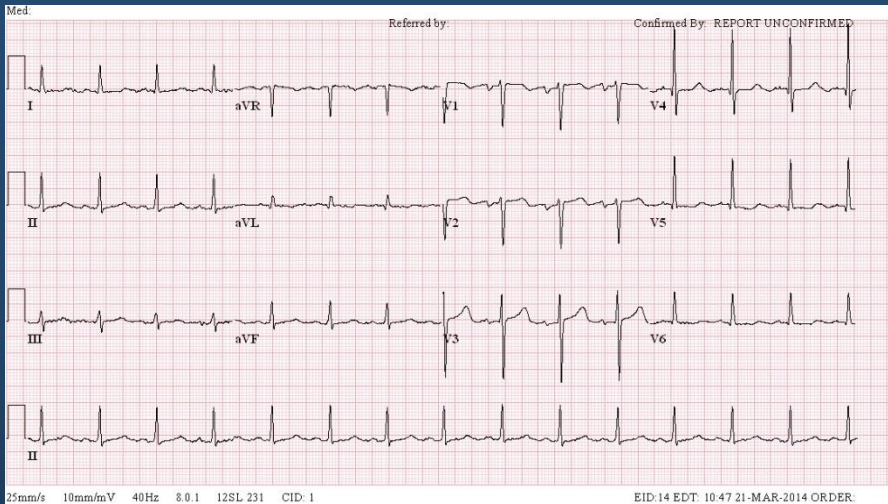
# TAVI procedure (2014-03-28)



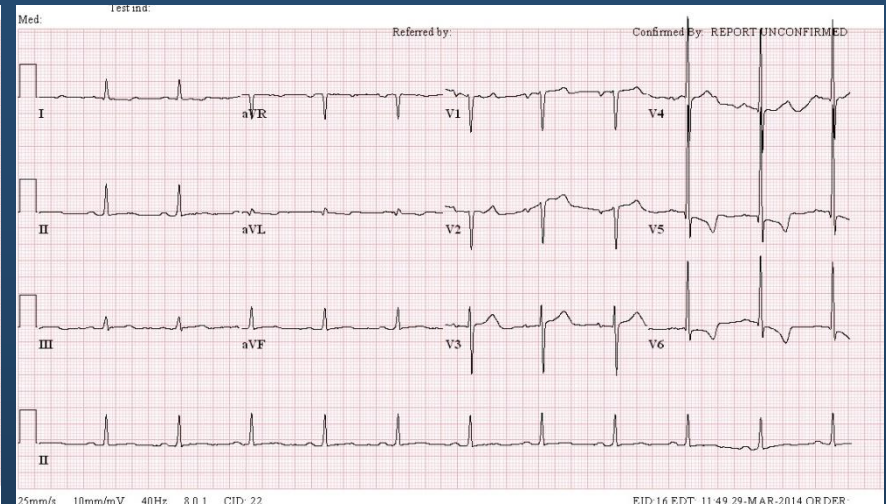
**Final Aorto – graphy (RAO 20)  
Severely tortuous aorta (U shape)**



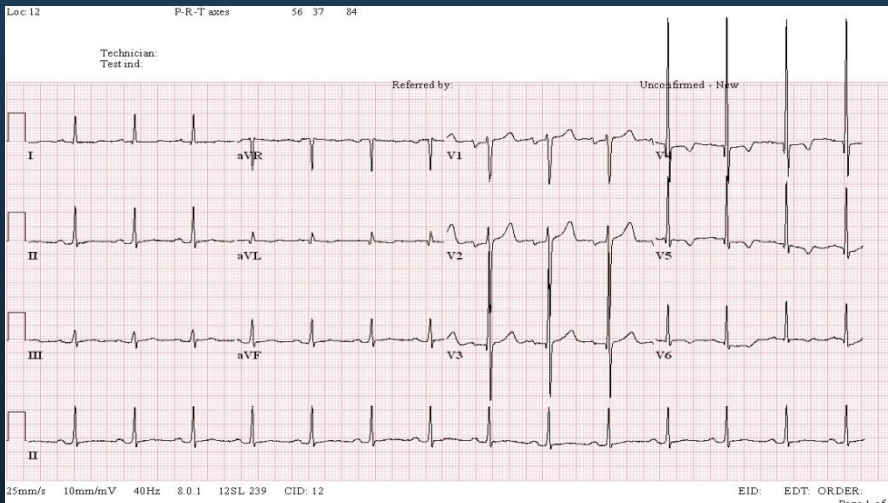
# ECG changes



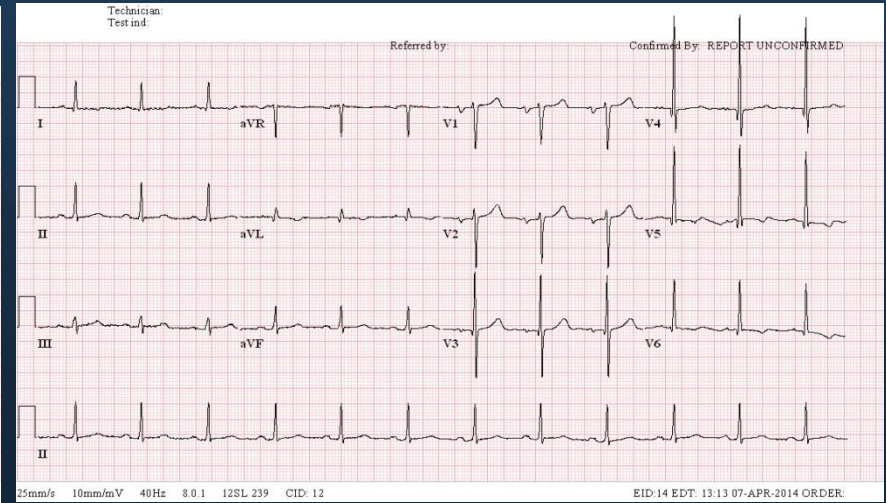
**Before TAVI**



**immediately TAVI**



**6 days after TAVI**

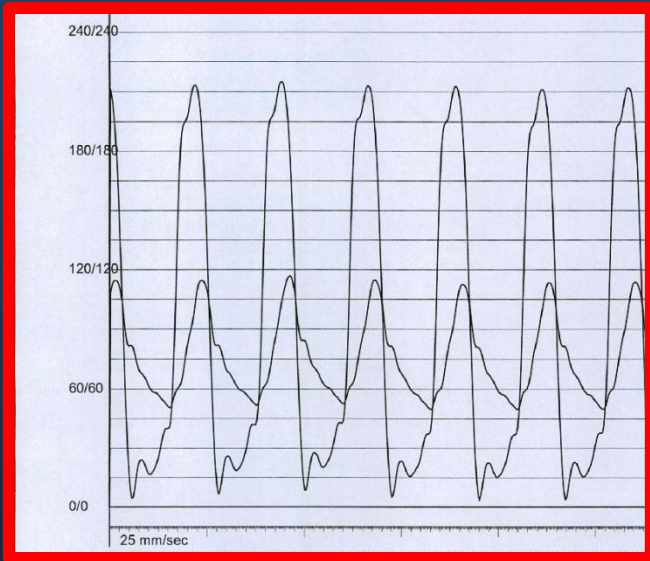


**8 days after TAVI**

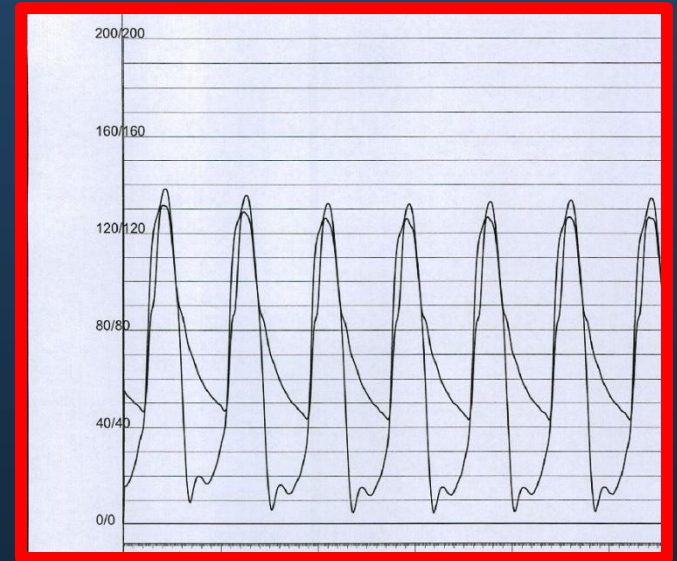


# TAVI procedure (2014-03-28)

## 29mm CORE-VALVE Stent Post-Ballooning



**AV mean PG 80 mmHg**



**AV mean PG 5 mmHg**

# TAVI procedure (2014-03-28) AR Index

	PRE TAVI				POST TAVI			
Ao.	SP	114	DP	50	SP	126	DP	44
LV.	SP	213	EDP	36	SP	132	EDP	13
Peak PG	99				6			
Mean PG	85				7			
AR Index					<b>25</b>			

$$\text{AR Index} = (\text{Ao.DP} - \text{LV.EDP}) / \text{Ao.SP} \times 100$$

Around 10 = Severe

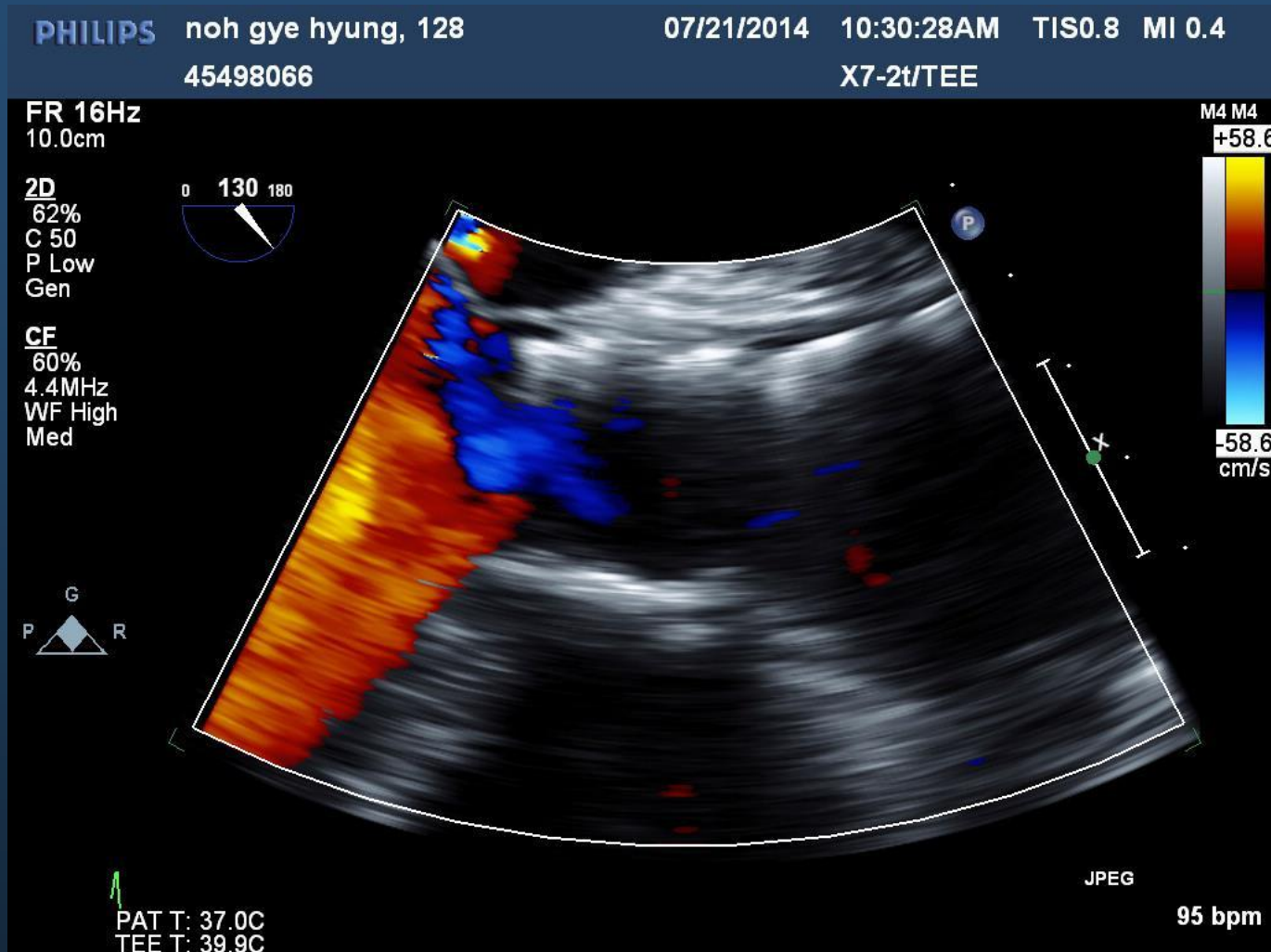
Around 20 = Moderate

Around 30 = Mild

More than 30 = Good



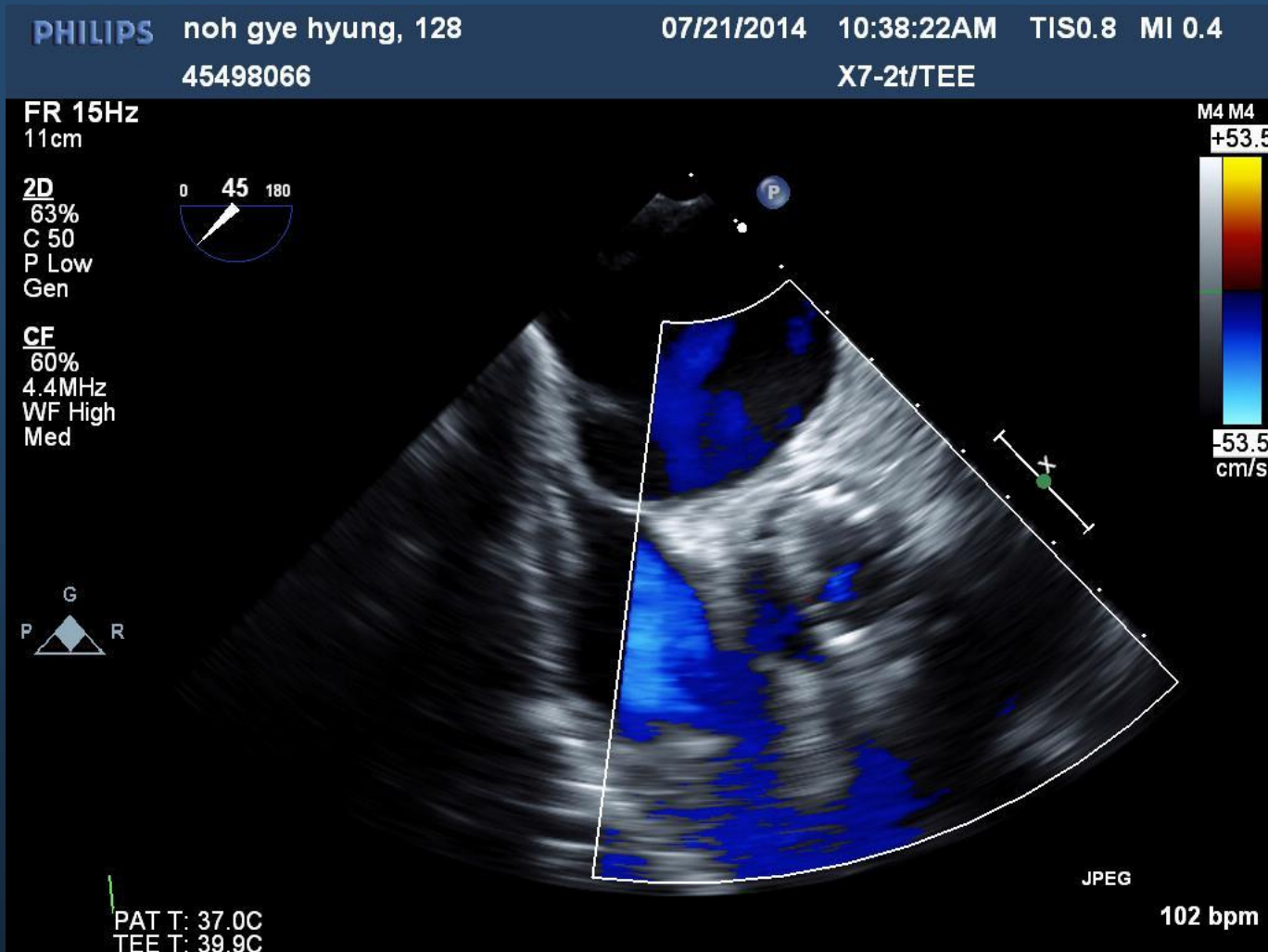
# F/U TEE (2014-07-21 / 4Mo F/U)



4 Mo F/U TEE – Long axial view



# F/U TEE (2014-07-21 / 4Mo F/U)



4 Mo F/U TEE – Short axial view

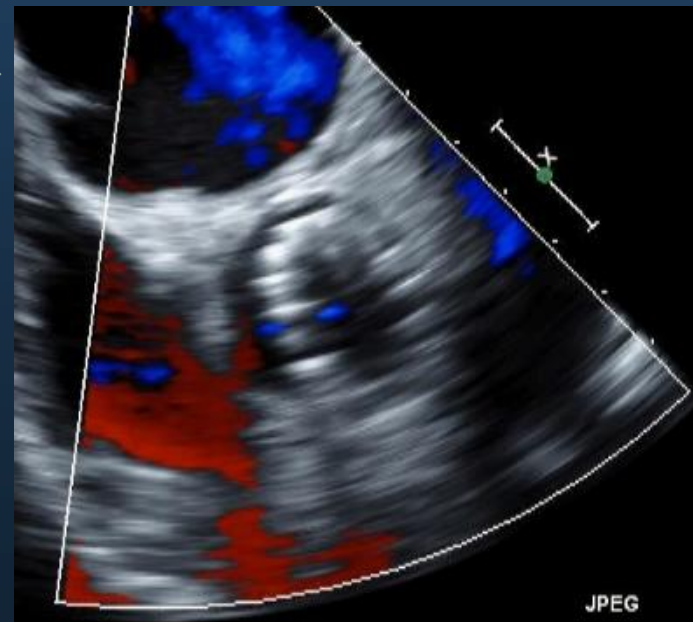




# Sequential change of PVL : remarkably improved

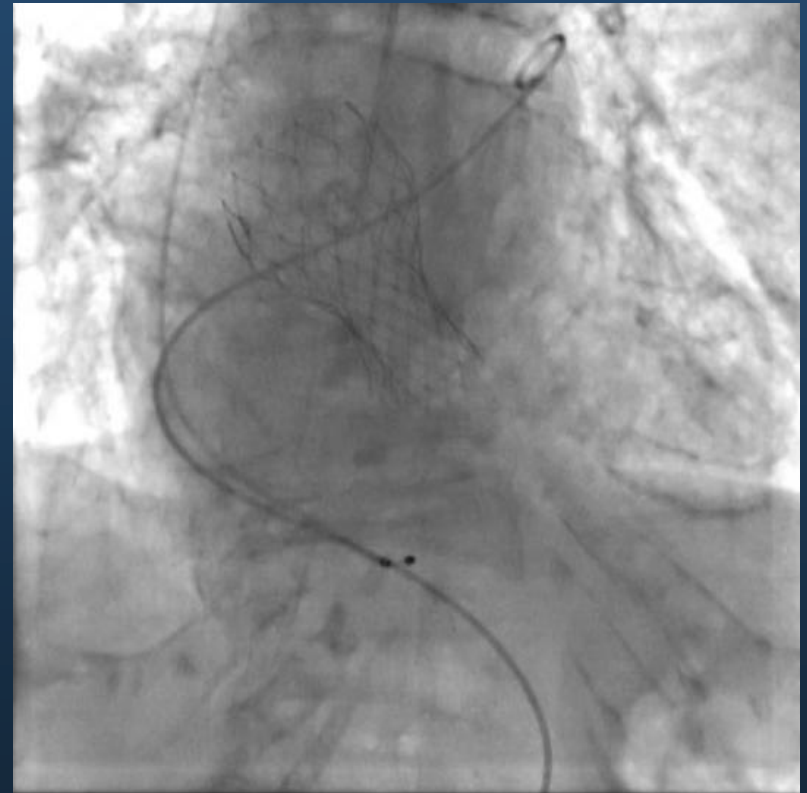
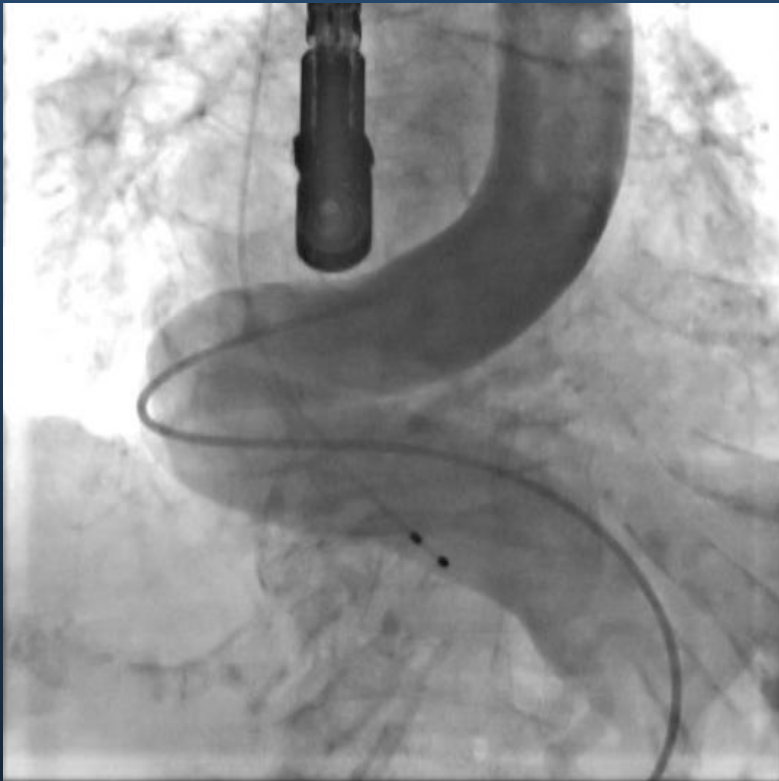


4 months





# U shaped tortuous aorta : not a contraindication for TAVI



# Medication

- Aspirin protect 100mg tab(Aspirin enteric coated) 1tab [P.O]daily pc [D]
- Plavix 75mg tab(Clopidogrel) 1tab [P.O]daily pc
- Roisol 30mg tab(Ambroxol HCl) 1tab [P.O]tid q8h



# Indication for TAVI





## Candidate for TAVI with Core Valve

1)AVA < 1cm<sup>2</sup> (0.6cm<sup>2</sup>/m<sup>2</sup>) and Age ≥ 80 years or

2)EuroSCORE ≥ 20% or

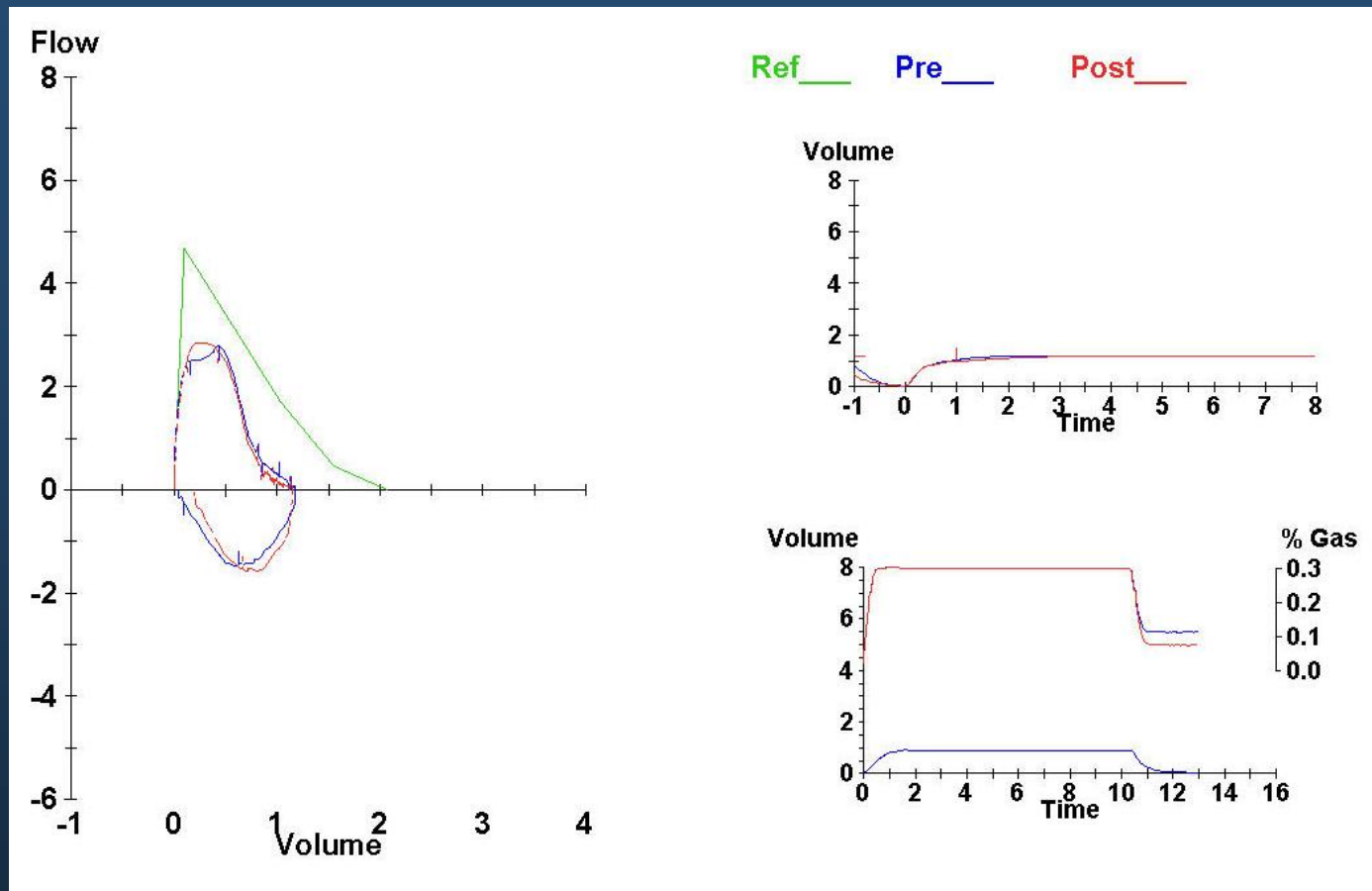
3)Age ≥ 65 with 1 or 2 below conditions

- LC child class A or B
- Pulmonary insufficiency (FEV1 < 1L)
- Porcelain aorta
- Pulmonary hypertension > 60mmHg
- Recurrent pulmonary embolus
- Right ventricular insufficiency
- Thoracic burning sequelae
- Radiotherapy to mediastinum
- Connective tissue disease
- Cachexia

 <u>Patient Factors</u>		Change sheet below change language 
Age		84yr
Sex		<input checked="" type="checkbox"/> Female
Chronic pulmonary disease		<input checked="" type="checkbox"/> Yes
Extracardiac arteriopathy		<input type="checkbox"/> Yes
Neurological dysfunction		<input type="checkbox"/> Yes
Previous cardiac surgery		<input type="checkbox"/> Yes
Serum creatinine >200 µmol/ L		<input type="checkbox"/> Yes
Active endocarditis		<input type="checkbox"/> Yes
Critical preoperative state		<input type="checkbox"/> Yes
 <u>Cardiac Factors</u>		
Unstable angina		<input type="checkbox"/> Yes
LV dysfunction moderate or LVEF 30-50%		<input type="checkbox"/> Moderate OR
Lv dysfunction poor or LVEF<30		<input type="checkbox"/> Poor
Recent myocardial infarct		<input type="checkbox"/> Yes
Pulmonary hypertension		<input type="checkbox"/> Yes
 <u>Operation Factors</u>		
Emergency		<input type="checkbox"/> Yes
Other than isolated CABG		<input checked="" type="checkbox"/> Yes
Surgery on thoracic aorta		<input type="checkbox"/> Yes
Postinfarct septal rupture		<input type="checkbox"/> Yes
Additive EuroSCORE		9
Logistic EuroSCORE (mortality %) =		15.56%
For the latest information on EuroSCORE visit <a href="http://www.euroscore.org">http://www.euroscore.org</a>		



# PFT+DLCO+BDR (2014-03-25)

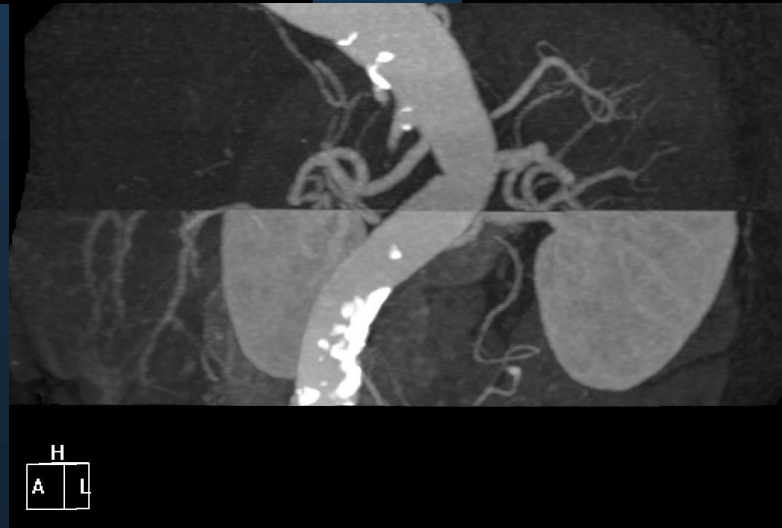


FEV1 1.03L (77%), FVC 1.25L (60%), FEV1/FVC = 83%  
DLCO 5.0 mL/min/min (48%)

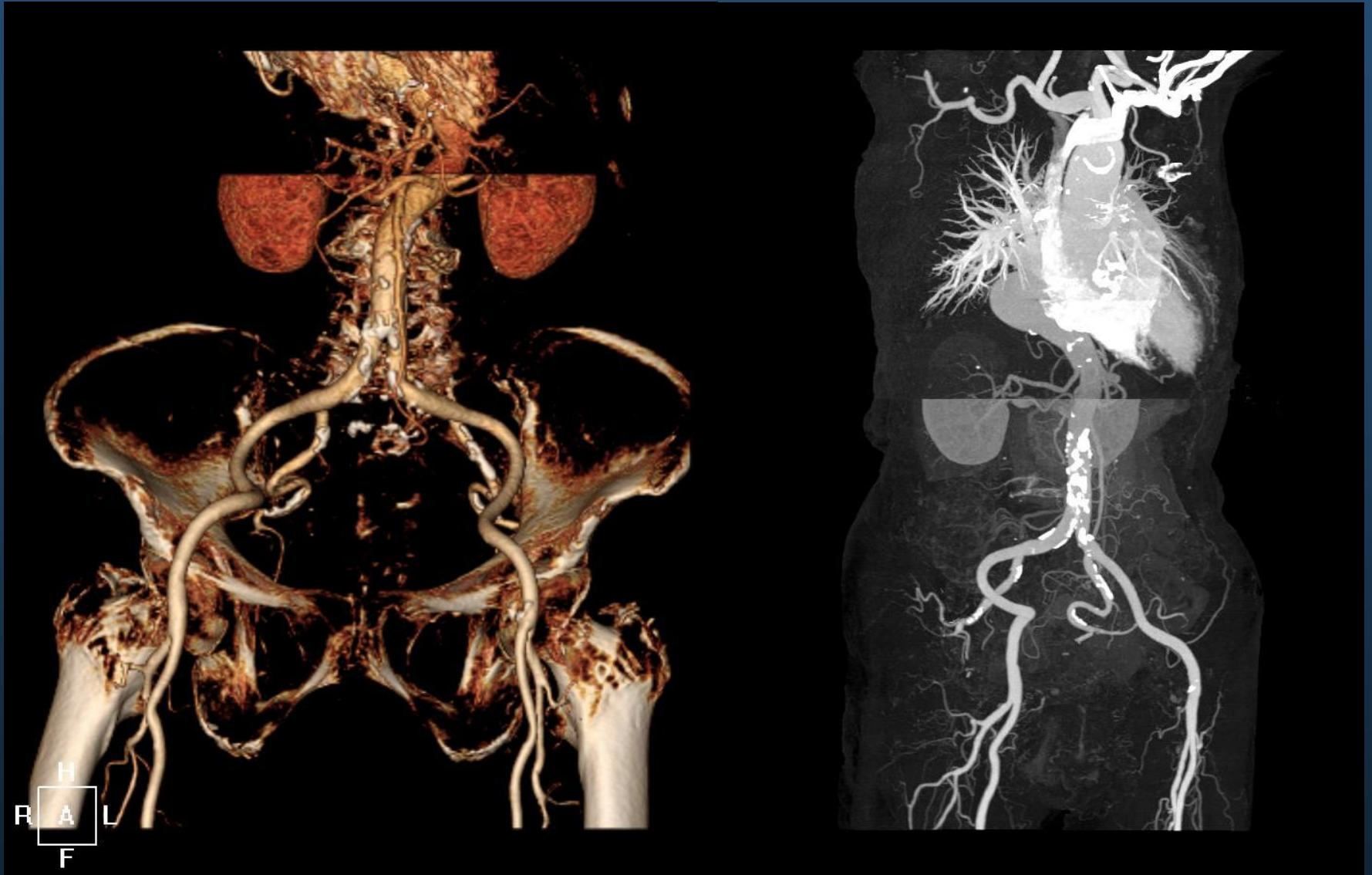
**Conc)** mild restrictive pattern, negative BDR response,  
decreased diffusing capacity



# CT angiography (pre TAVI 7 days)

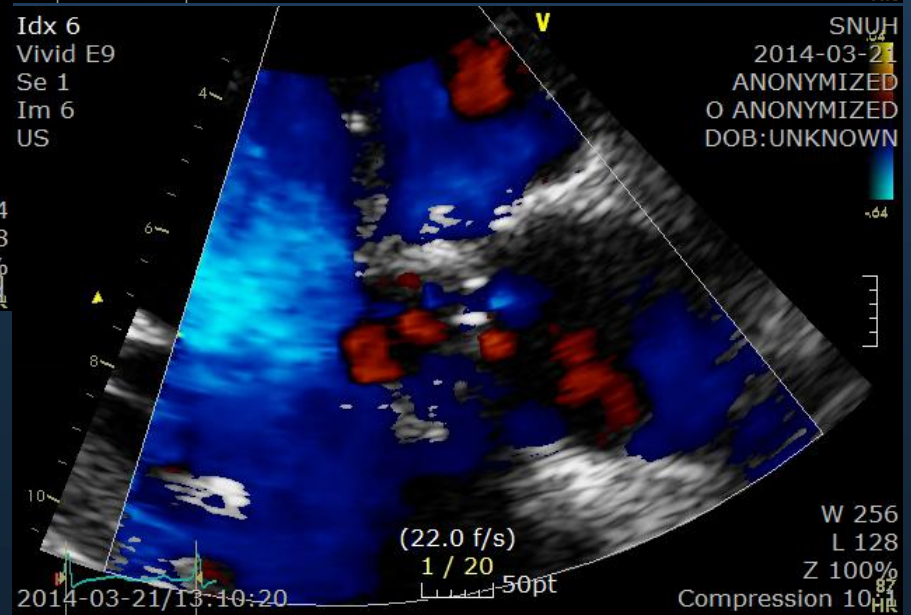
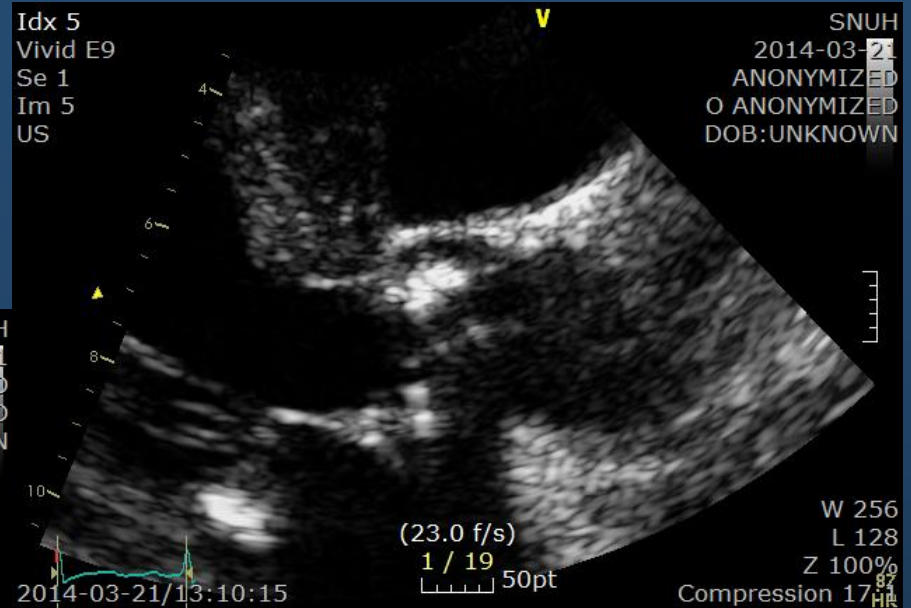
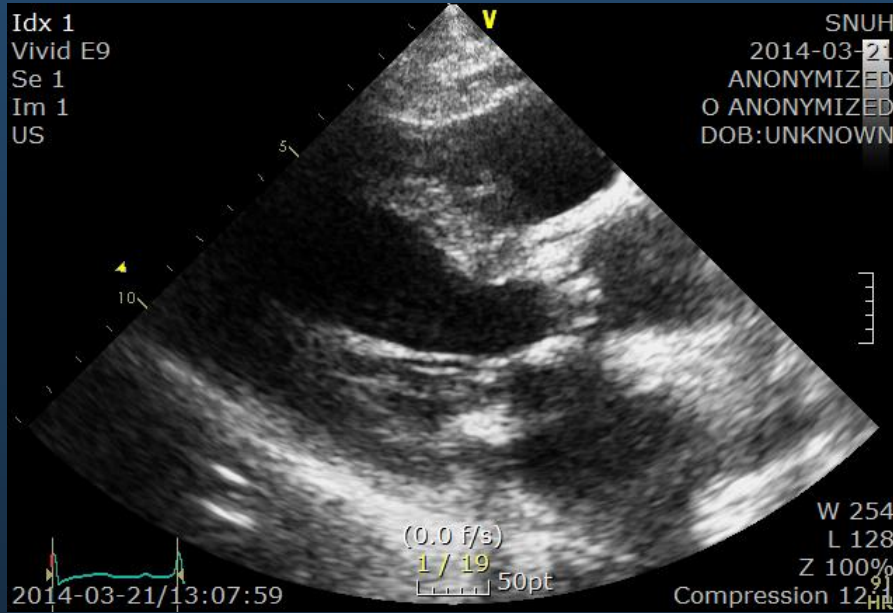


# CT angiography (pre TAVI 7 days)





# TTE (2014-03-21)



# TTE (2014-03-21)

