

알면 좋은 심초음파 소견

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이상현

Imaging an Outbreak Using Point-of-Care Ultrasonography in an Ebola Treatment Unit



NEJM 381;1 July 4, 2019

Obstetrical

Pulmonary

Gastrointestinal

Hepatobiliary

Genitourinary

**Cardiovascular : chest pain & dyspnea
volume status**

sound can be used to assess for signs suggesting EVD-related myocarditis, pericarditis, or pericardial effusion. Assessment of inferior vena cava collapsibility may complement other estimates of intravascular volume status. If pulmonary embolism is suspected, evaluation for deep vein thrombosis can be coupled with cardiac assessment for right ventricular dysfunction.

Point-of-care ultrasonography (POCUS)

Stethoscope (청진기) = Steth (chest) + phone (sound)

→ Truly, Scope (to look in) can be possible



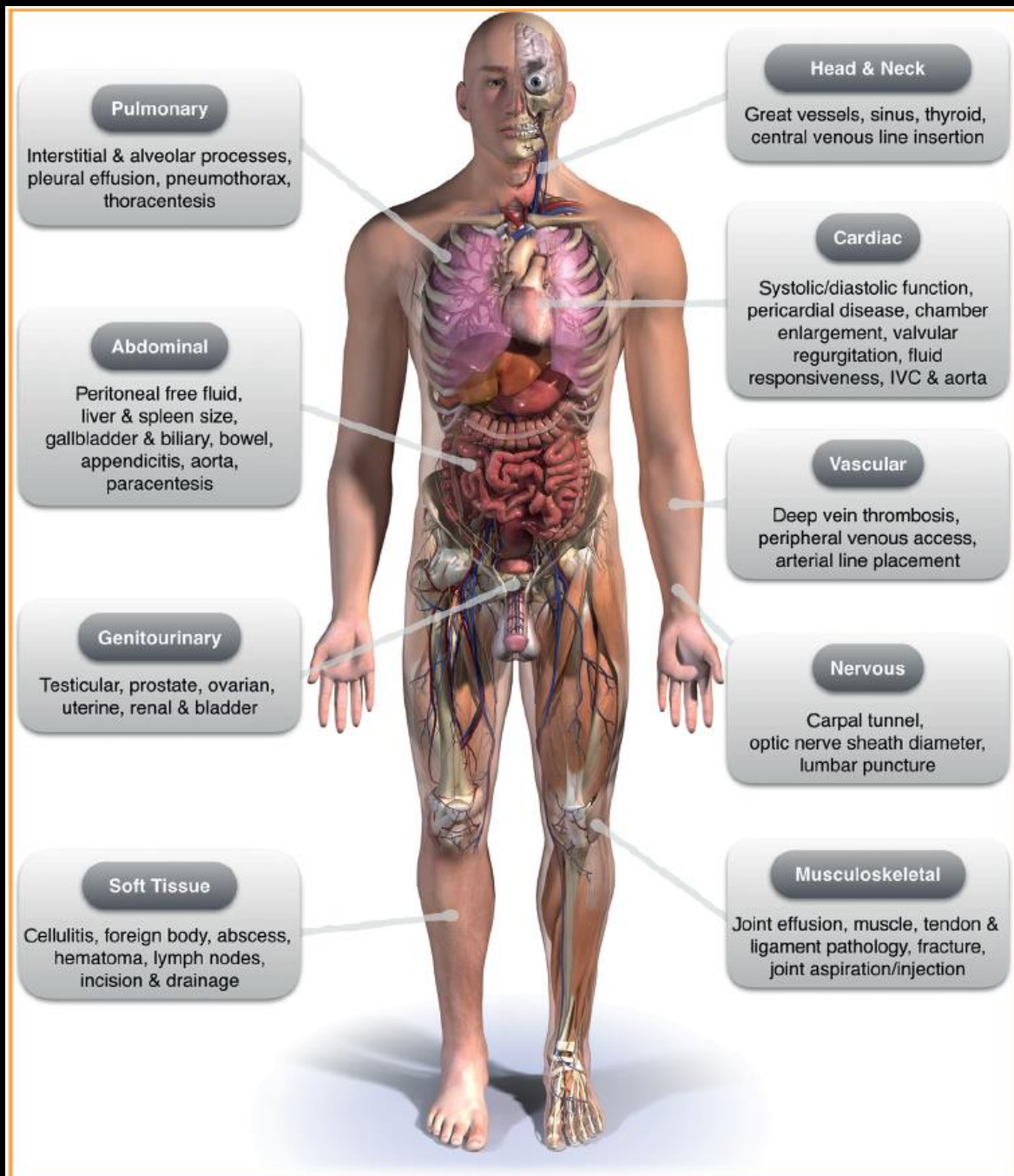


FIGURE 1. Internal medicine point-of-care ultrasonography applications. IVC = inferior vena cava

무엇을 볼 것인가 ?

=

초음파 검사가 왜 필요한가 ?

F / 71

HTN

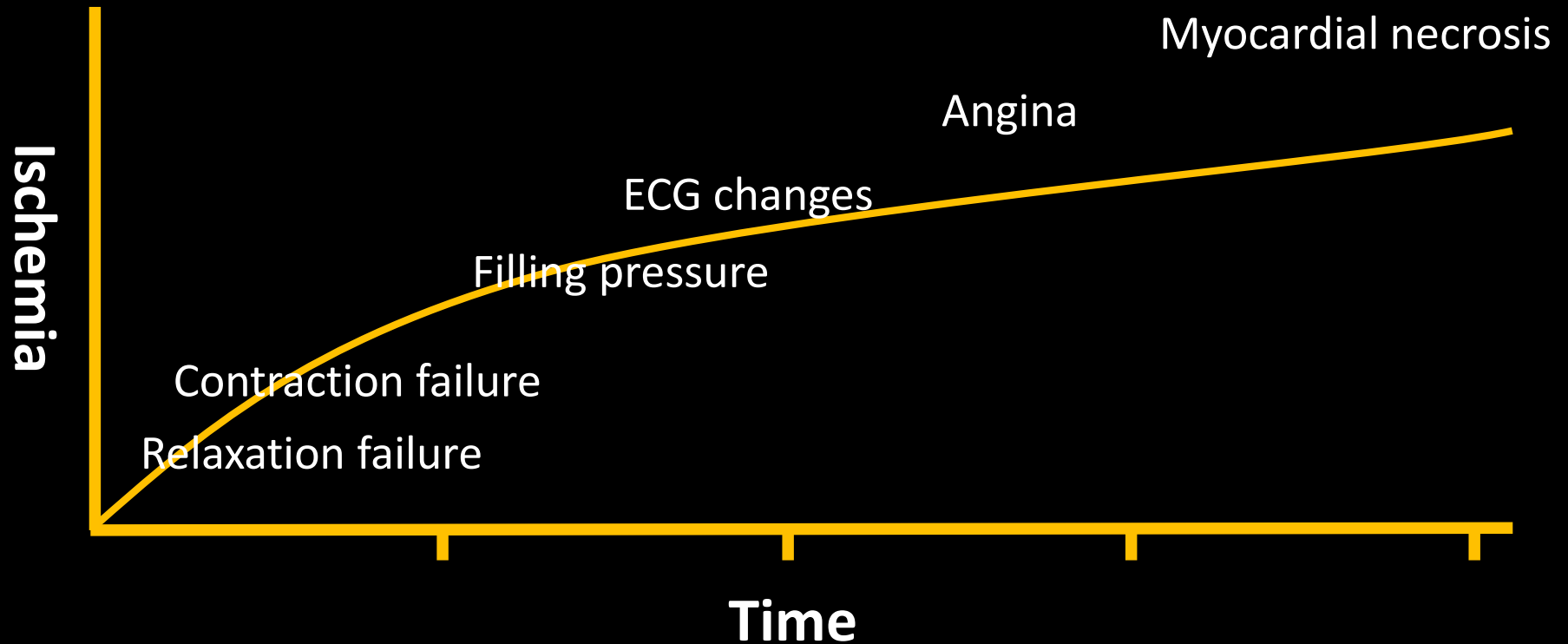


Concentric LVH

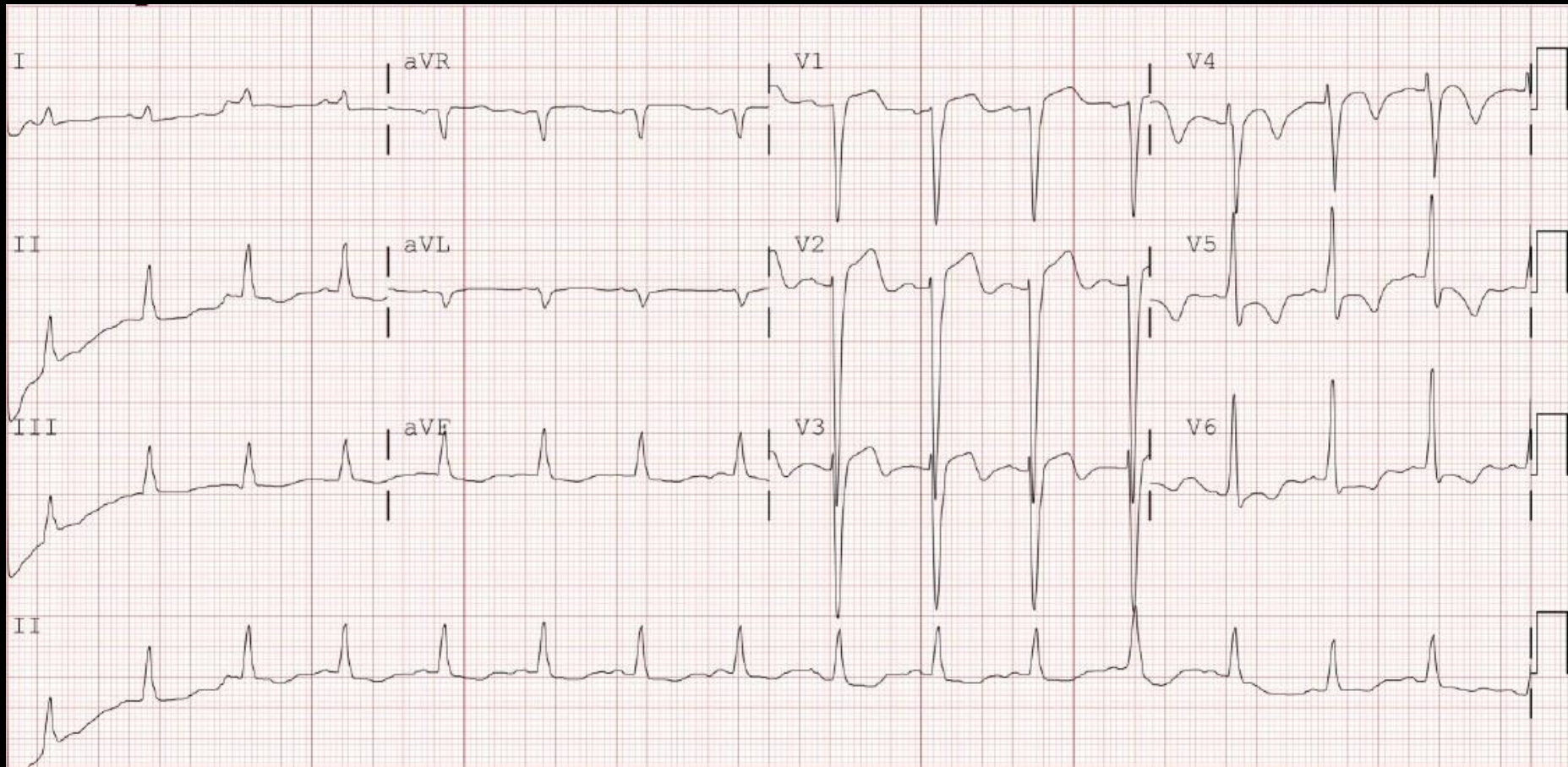
Referral diagnosis		dyspnea				
LV	IVS_D(mm)	EDD(mm)	PW_D(mm)	EDV (ml)	SV(ml)	EF(%)
	11,5	38,6	11,0	43	30	67
	IVS_S(mm)	ESD(mm)	PW_S(mm)	ESV (ml)	CO(ml)	
	12,4	20,8	16,9	13	2490	
RV	EDD(mm)	ESD(mm)	RV_D(mm)	PE	☐ Yes	☒ No
LA	AP (mm)	LA Vol (mL)		IVC Plethora		
	33			No		
Asc. Ao.	Annulus(mm)	Sinus(mm)	STJ(mm)	Tubular(mm)		
		31				

Ischemic Heart Ds.

Ischemic Cascade



M / 64 Chest pain











Valvular Heart Ds.

F / 42 Dyspnea



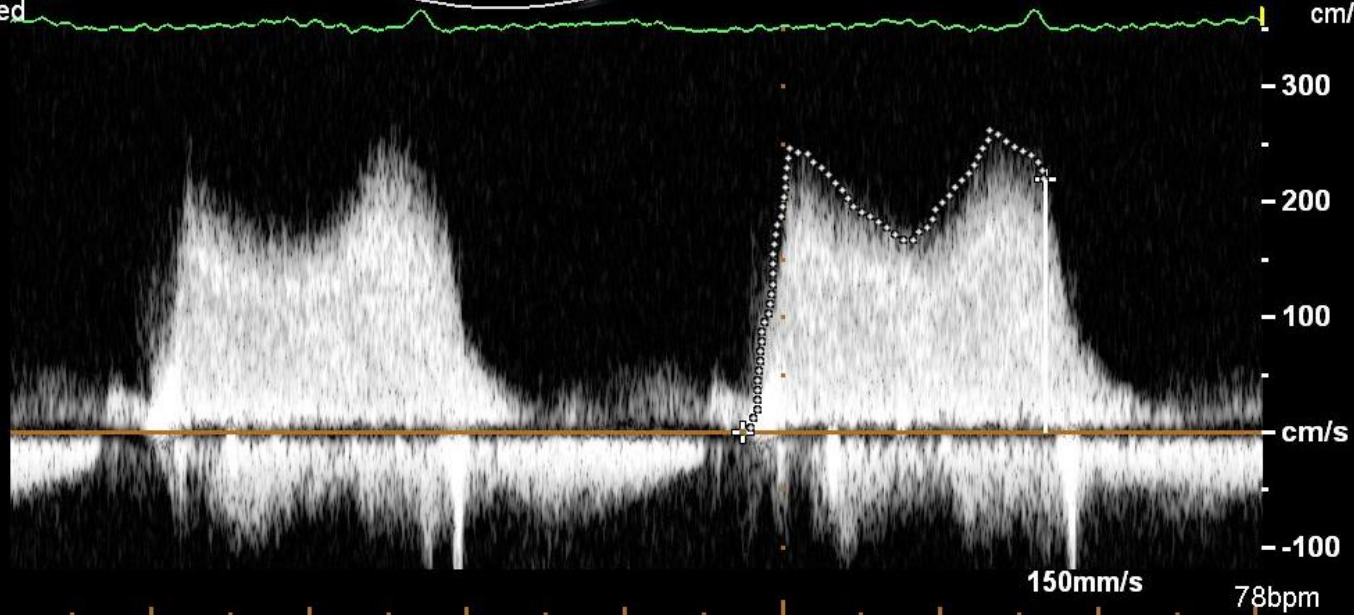
PR 10MHz
15cm

2D
55%
C 50
P Low
HPen
CF
66%
2.5MHz
WF High
Med



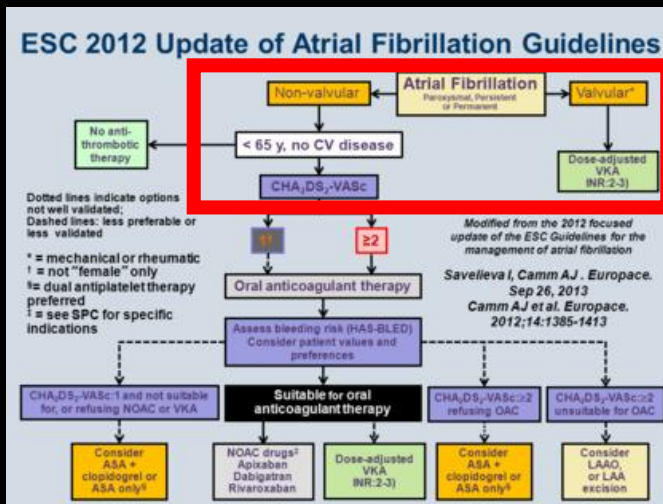
Mean PG :
17mmHg

M3 M4
+67.0
-67.0
cm/s



Mitral Stenosis

Impression	EF(%)	65
<u>Severe rheumatic MSr</u>		
Mild rheumatic Ar(II/IV)		
Mild resting pul, HTN with trivial Tr		
Normal LV size and contractility		
Markedly dilated LA dimension		



Non-valvular AF → consider CHADS2-VASc

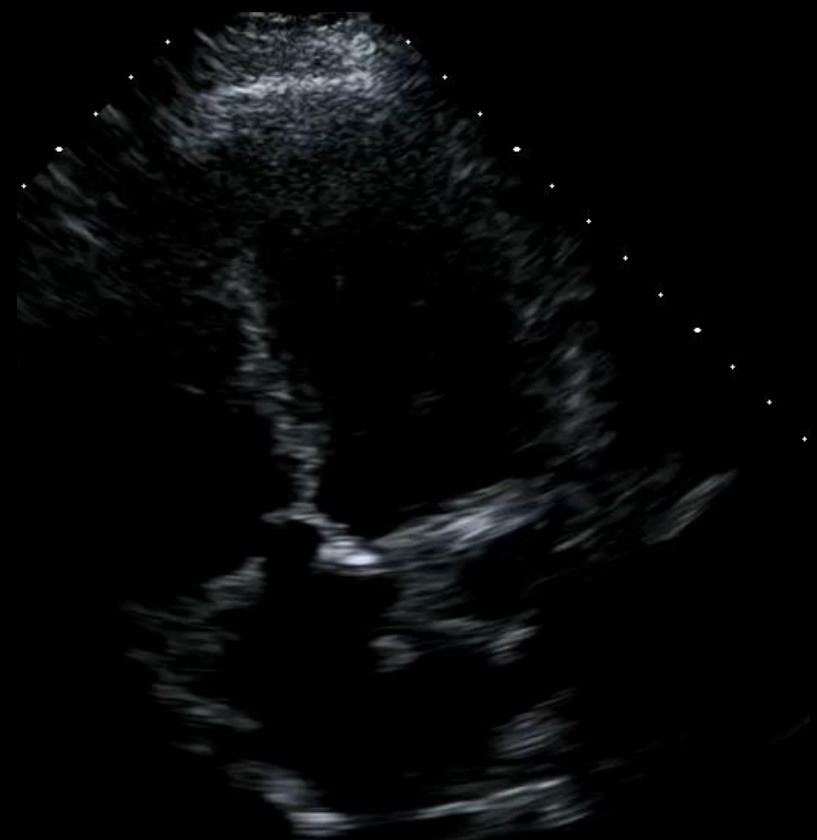
Valvular AF → Anticoagulation Tx.

F / 54 Chest pain



68 bpm





1 AoV VTI = 1.460 m
AoV Vmax = 5.93 m/s
AoV Vmean = 4.55 m/s
AoV Peak Grad = 140.7 mmHg
AoV Mean Grad = 89.2 mmHg
AoV AT = 150 msec
AoV ET = 321 msec



Vmax : 5.9 m/s

Mean PG : 89mmHg

117 mm
0°

0.77 m/s

m/s

1.00

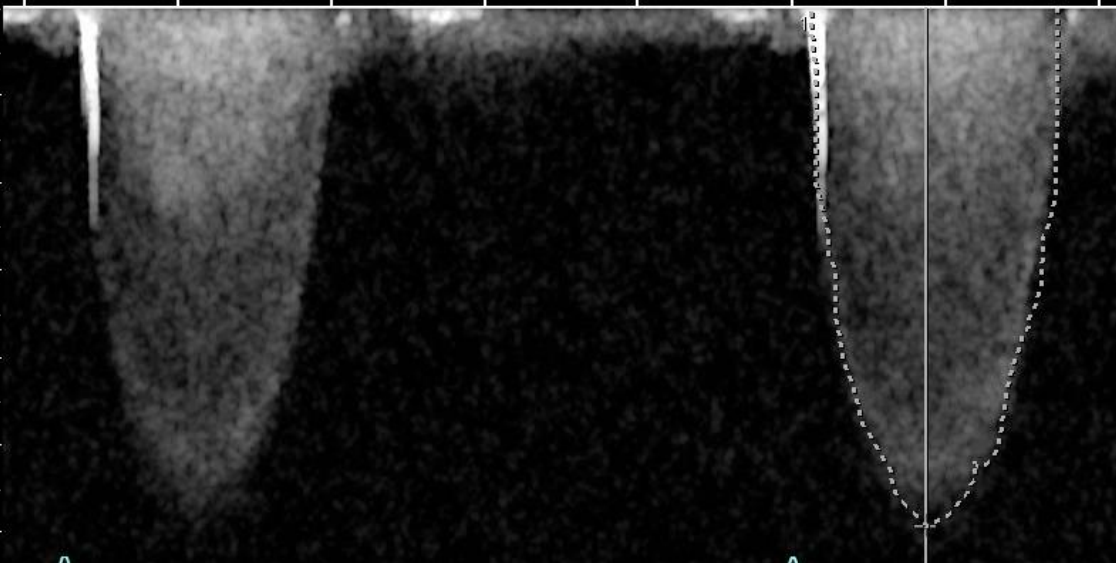
2.00

3.00

4.00

5.00

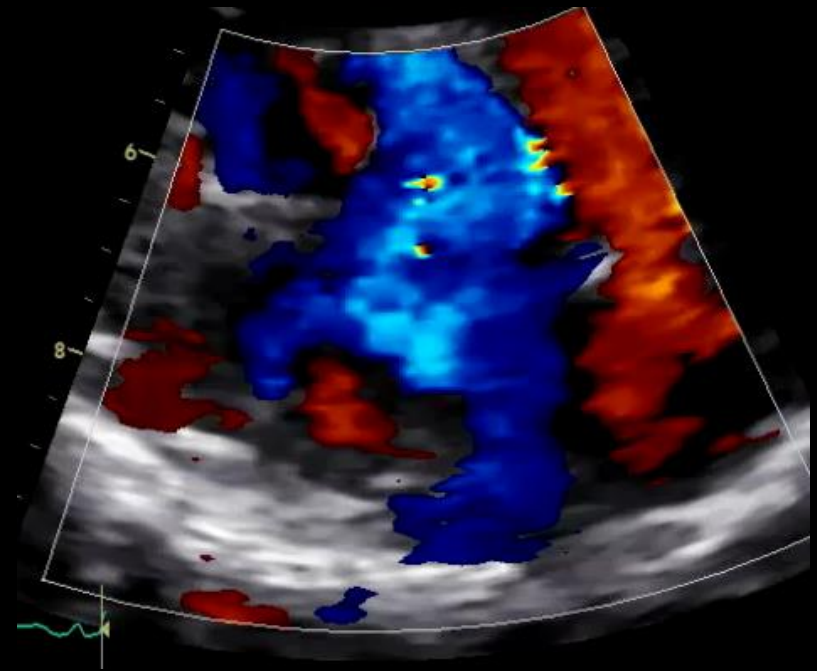
6.00



Aortic Stenosis

Impression	EF(%)	72
<u>Very severe degenerative AS(bicuspid AV)</u>		
Massive concentric LVH with normal LV contractility		

M / 45 Ventriculitis, murmur (+)

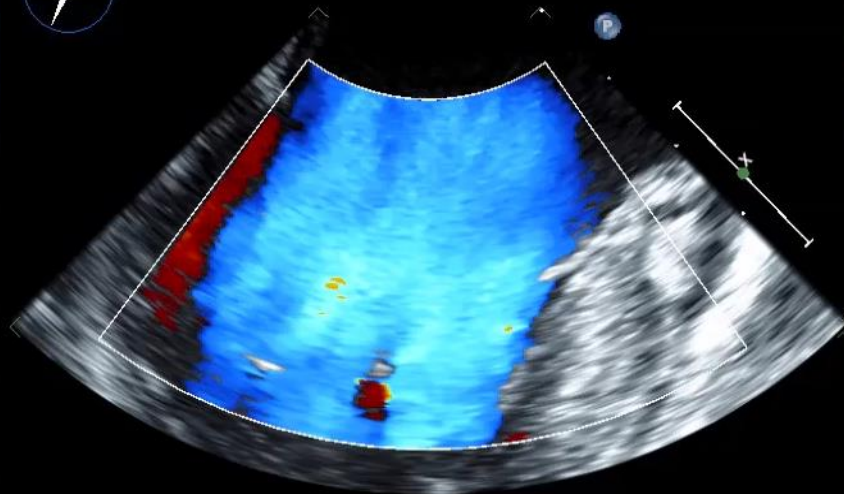


Mitral Regurgitation

Normal LV size and contractility
R/O vegetation on PML with moderate eccentric MR

Recommendation

임상적으로 감염성 심내막염이 의심된다면 TEE 검사 시행해 보시기 바랍니다.



Impression

Severe eccentric MR d/t perforation of posterior lateral scallop (P1)

Highly mobile echogenic material attached to LA side of MV & abscess formation at LA lateral wall

: r/o infective endocarditis

Minimal atherosclerotic change in the thoracic aorta

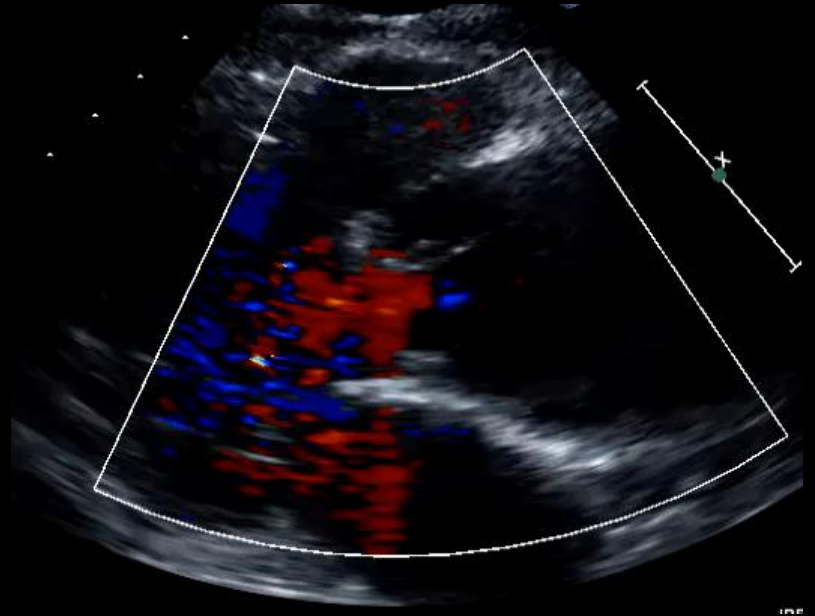
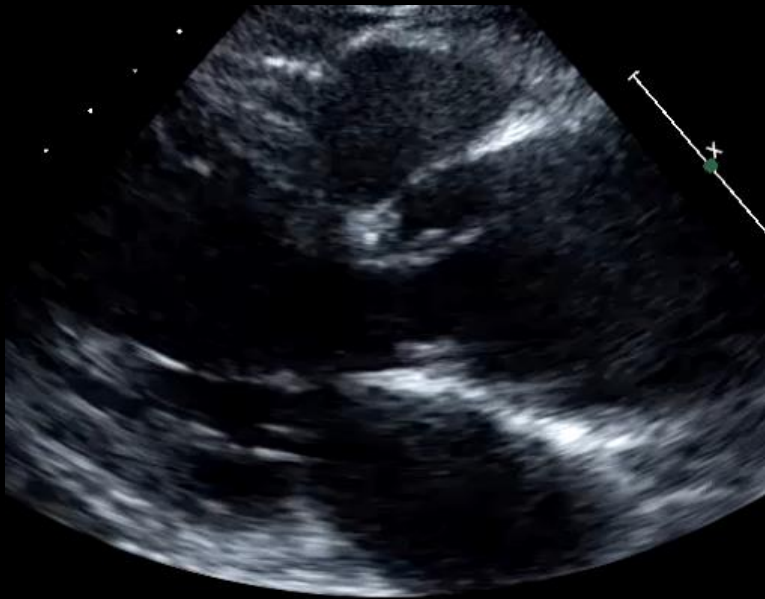
<OP findings>

Mitral valve: severe degenerative MR at P1-P2

Massive vegetation at P1-P2, vegetation extension to LV along infected chorda

Organize vegetation infiltrated to LV posterolateral wall

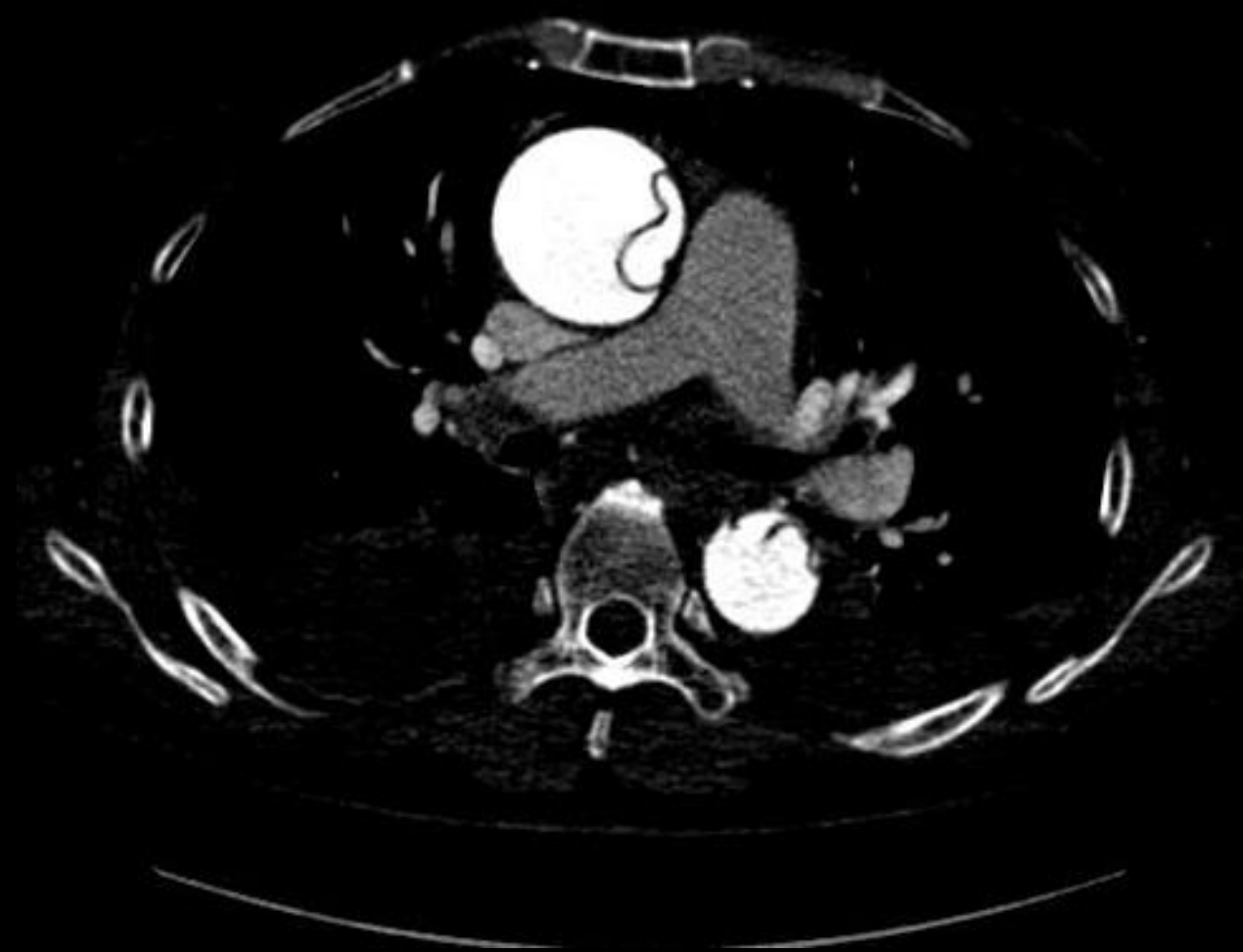
F / 54 Leg weakness, Back pain, Dyspnea
100 / 40 mmHg – 90 bpm





Aortic Regurgitation

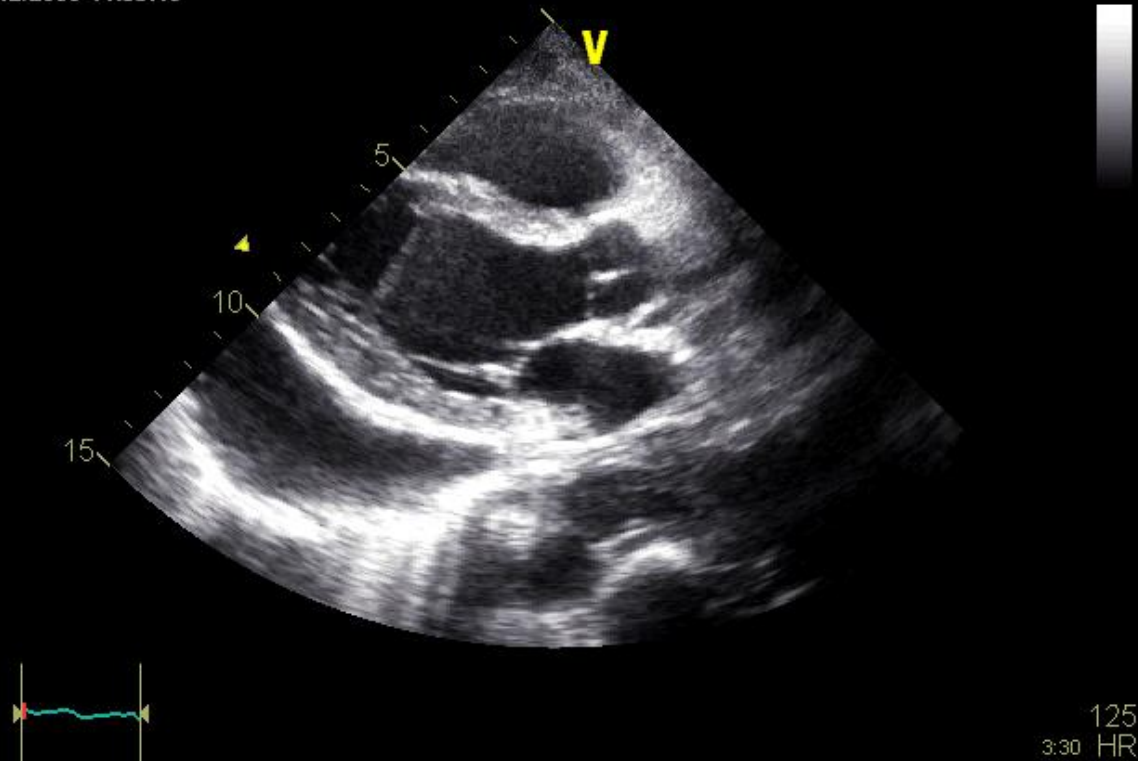
Impression	EF(%) 68
***환자 상태가 좋지 않아 충분한 검사가 이루어 지지 않음	
Severe functional AR(IV/IV) d/t coaptation failure r/o) aorta dissection with flap	
Severe resting pul,HTN with mild Ir Normal LV size & contractility	
Recommendation	
aorta CT	





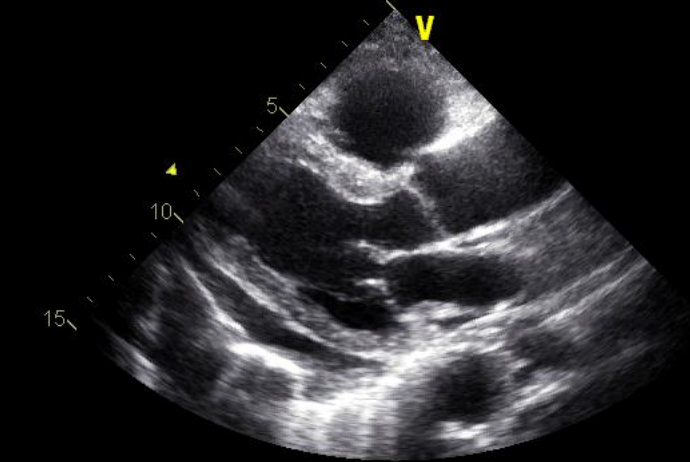
Pericardial effusion

19/12/2008 11:33:18



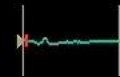
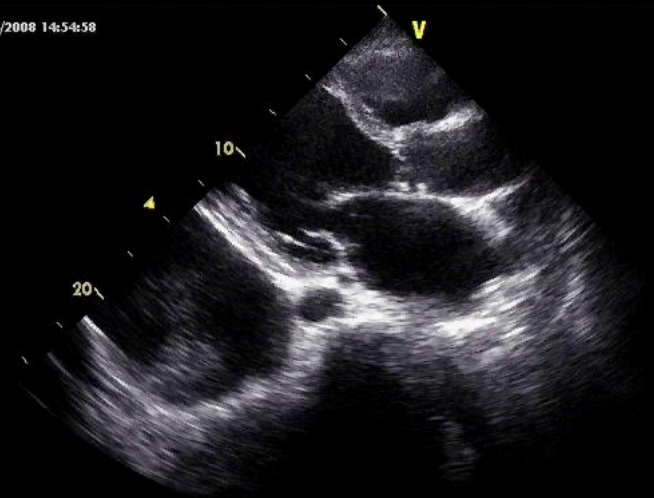
Pericardial effusion vs. Pleural effusion

14/10/2009 09:03:14



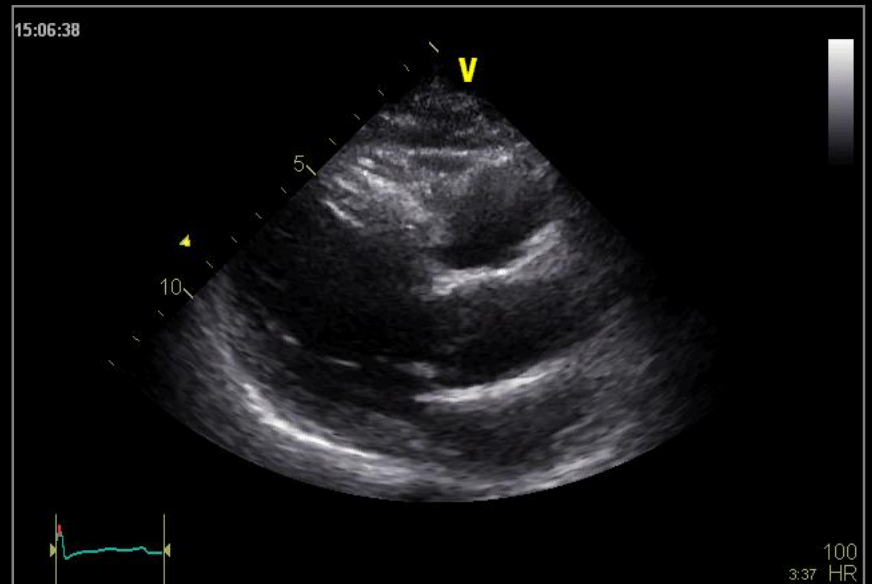
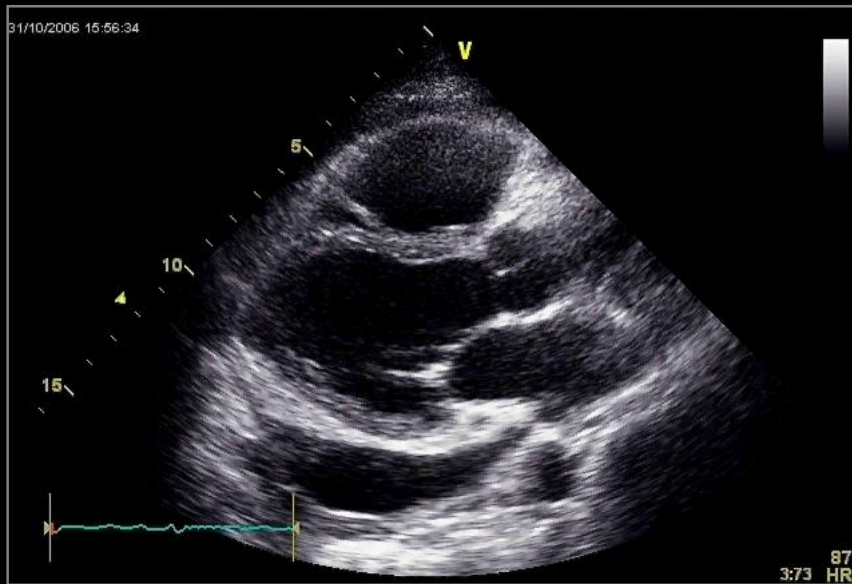
85
3.42 HR

26/08/2008 14:54:58



94
HR

Pericardial effusion vs. Pericardial fat



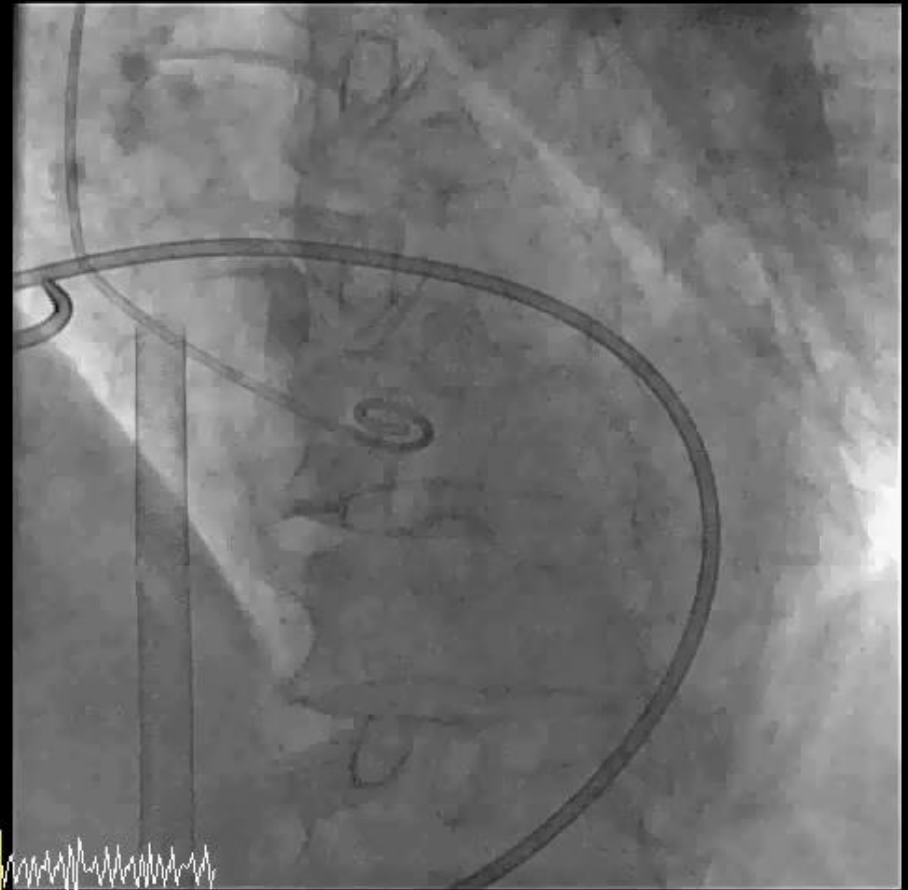
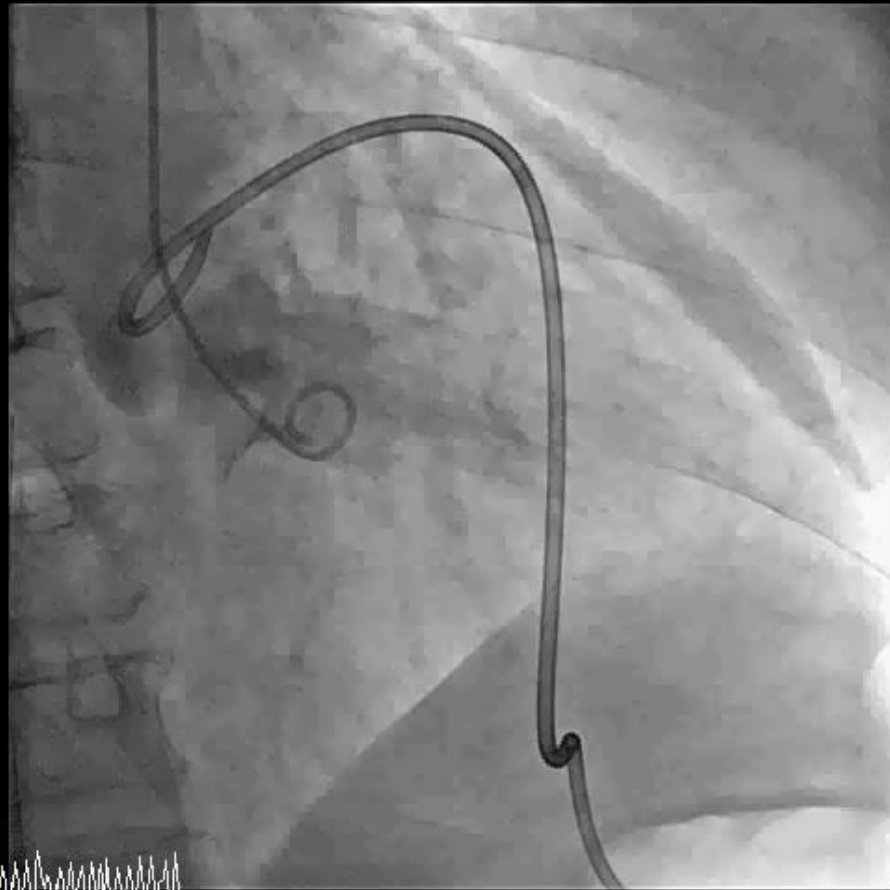
F/ 79

Chest pain, Shock



검사항목	검사결과	이전결과	R	P	D	참고치	결과단위
pH	8.0						
B/F : Appearance	Bloody		*			N/A	
B/F RBC	3462.80					N/A	10E3/uL
B/F cell count	3034					N/A	개/uL
B/F Neutrophil %	80.9					N/A	%
B/F Lymphocyte %	16.9					N/A	%
B/F Monocyte %	1.2					N/A	%
B/F Eosinophil %	1.0						%
B/F HF(High Fluorescence) %	0.2						/100WBCs
Cl	97						
Glucose	361						mg/dL
T. Protein	7.0						gm/dL
LDH	934						IU/L
Amylase	26						IU/L

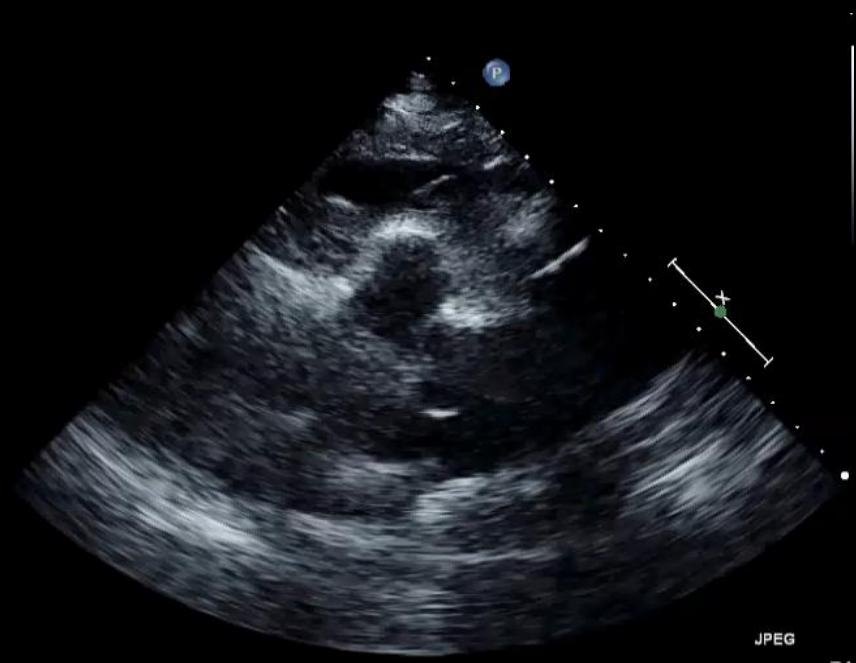
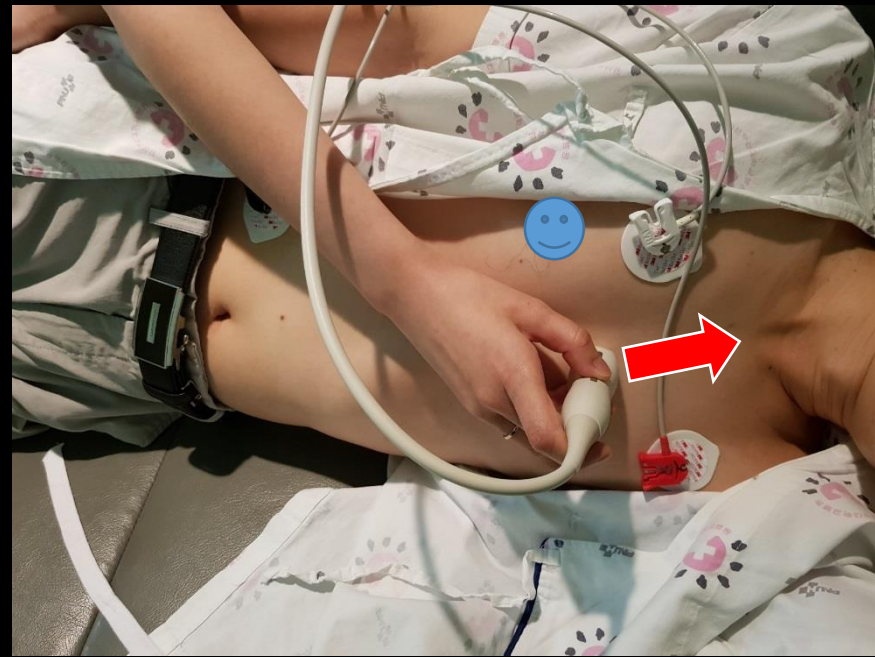
LV angiogram



Acute Hemopericardium 일때

반드시 생각할 것 !

1. Complications of MI (free wall rupture)
2. Aortic dissection
3. Trauma

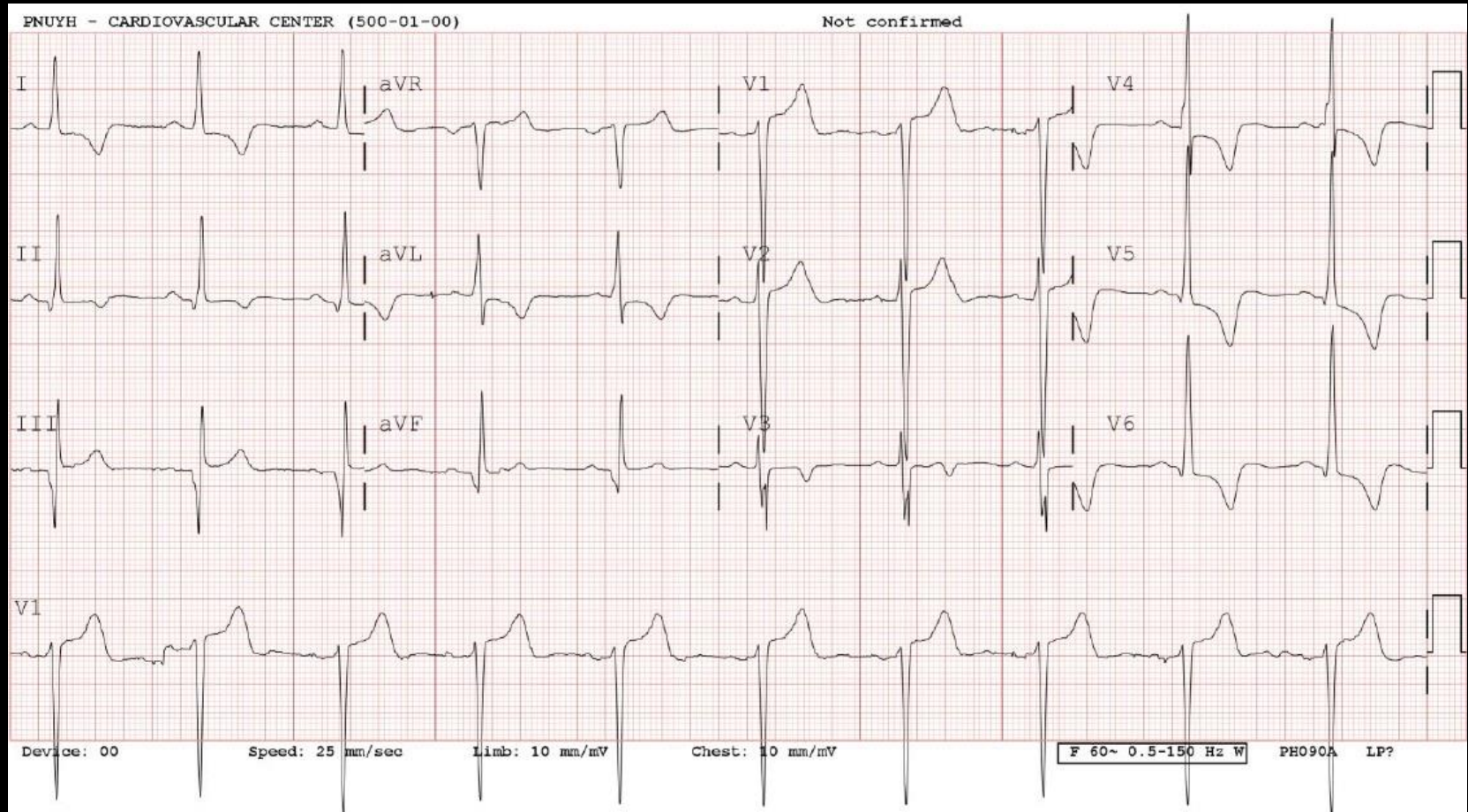


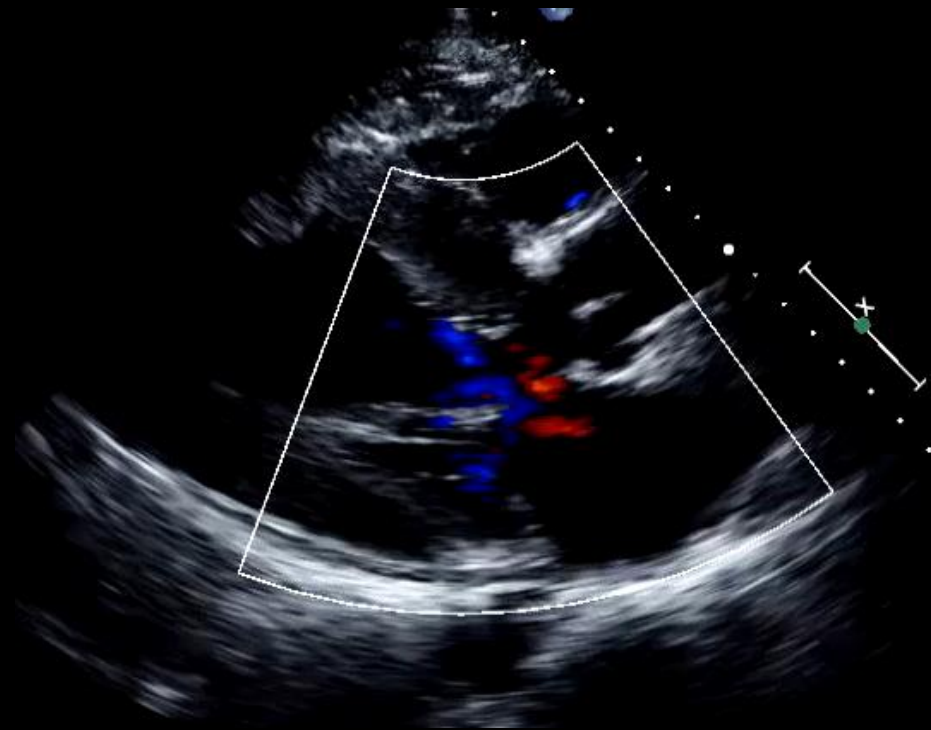
Hemopericardium

- Malignancy – 26%
- Percutaneous interventional procedures – 18%
- Post-pericardiotomy syndrome – 13%
- Complications of myocardial infarction (free wall rupture) – 11%
- Idiopathic – 10%
- Other causes (including uremia, aortic dissection, trauma, etc) – 22%

Atar S, Chiu J, Forrester JS, Siegel RJ. Bloody pericardial effusion in patients with cardiac tamponade: is the cause cancerous, tuberculous, or iatrogenic in the 1990s Chest 1999; 116:1564.

M / 57 Abnormal ECG



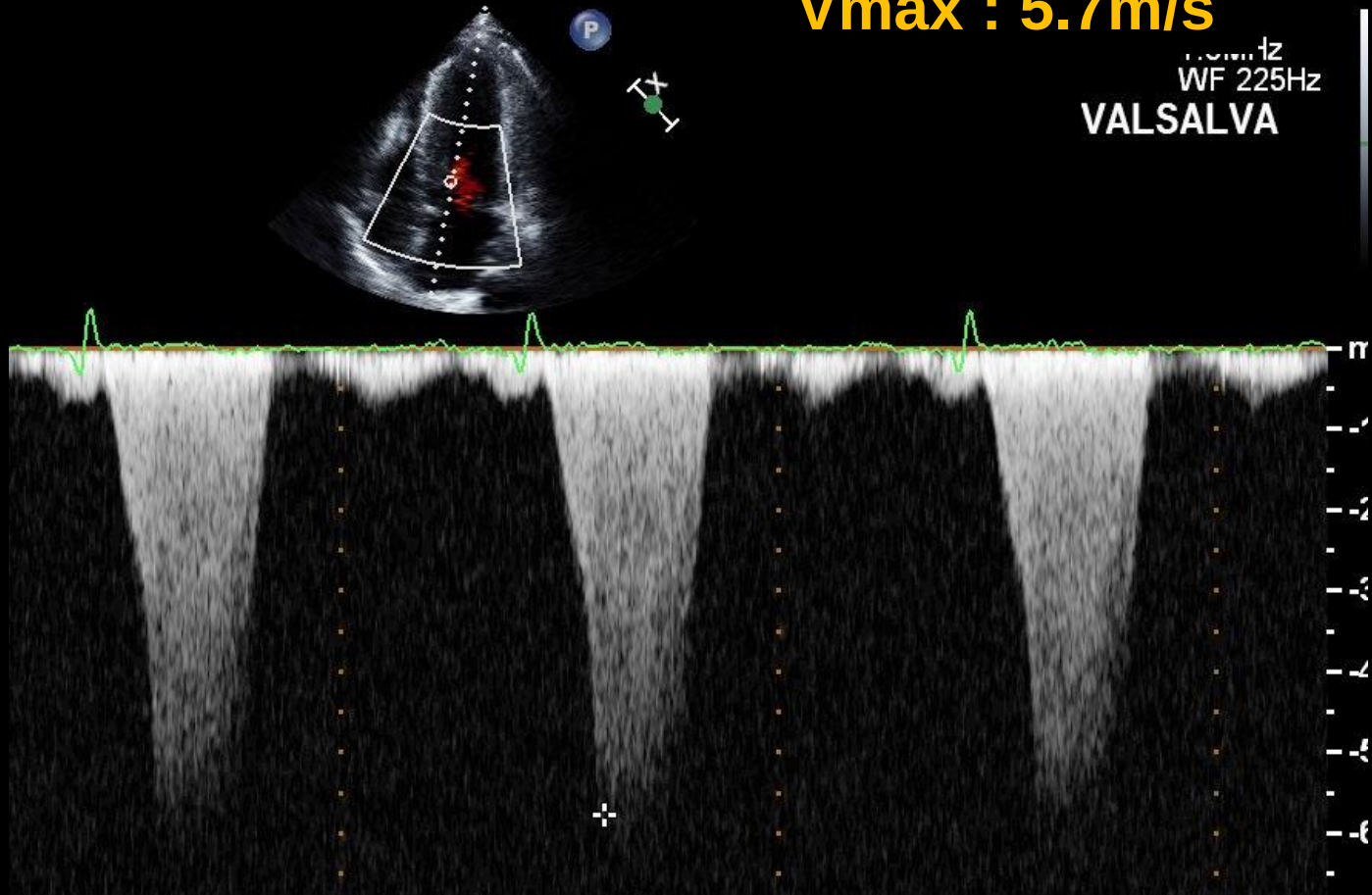




Vmax : 5.7m/s

WF 225Hz

VALSALVA



Hypertrophic CM with LVOT obstruction

Impression	EF(%)	68
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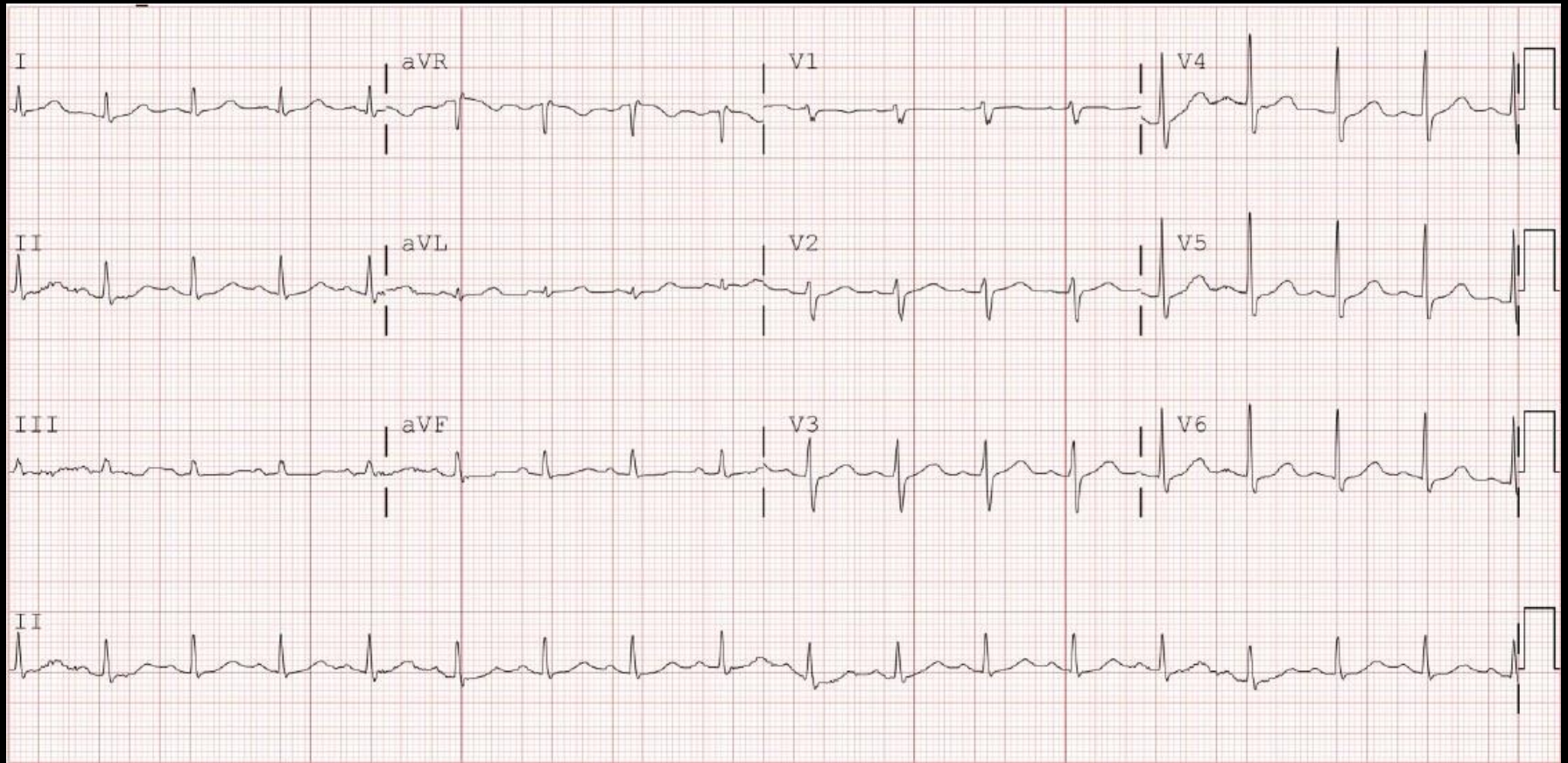
Thickened LV walls with normal LV contractility
: r/o hypertrophic cardiomyopathy
Dynamic LVOT obstruction (SAM & septal contact of AMVL)

Dilated LA

Mild Mr (I/IV)

Suspicious elevated LVEDP

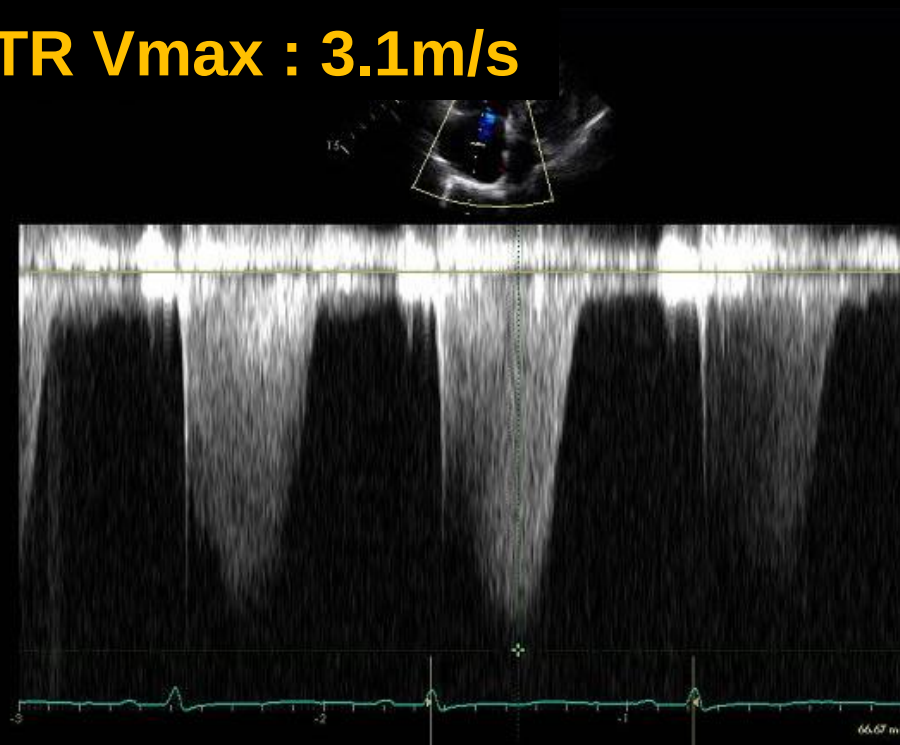
F / 74 Dyspnea







TR Vmax : 3.1m/s



McConnell's sign

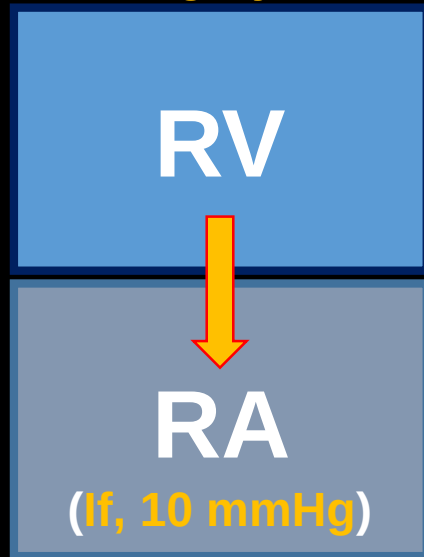
77% Sensitivity and 94% specificity for acute pul. Embolism

: RV dysfunction with akinesia of the mid free wall but normal motion at the apex

Mechanism

1. the tethering of the right ventricular apex with hyperdynamic left ventricle
2. an abrupt increase in afterload
3. localized ischemia of the RV free wall as a result of increased wall stress

During Systole



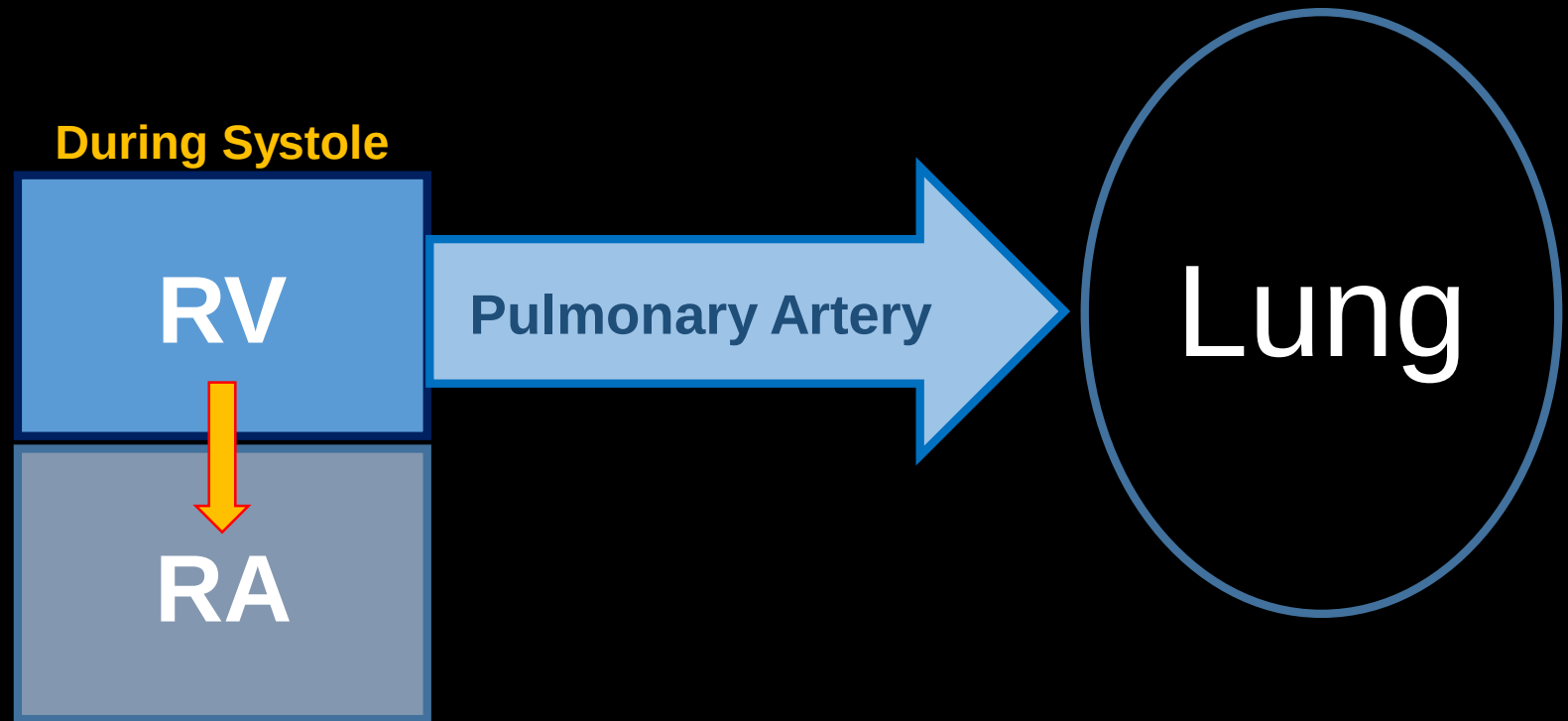
Modified Bernoulli equation

$$RV_p - RA_p =$$

$$\Delta P = 4 V(TR v_{max})^2$$

Pressure gradient (ΔP) = $4 \times 3.1^2 = 38 \text{ mmHg}$

***RV systolic pressure** = $88 + 10 = 48 \text{ mmHg}$*



***RV systolic pressure* = Systolic Pulmonary Artery pressure**

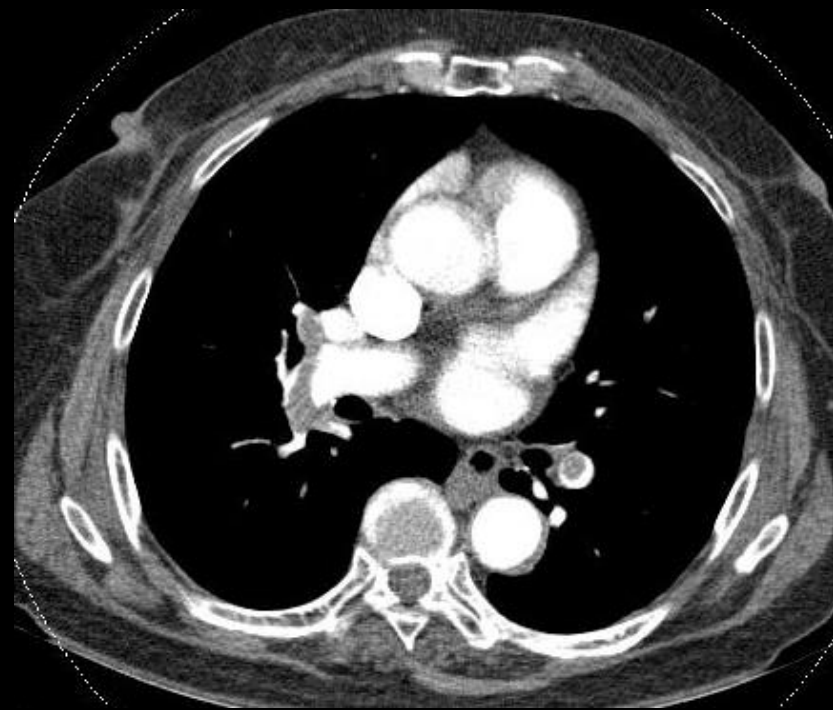
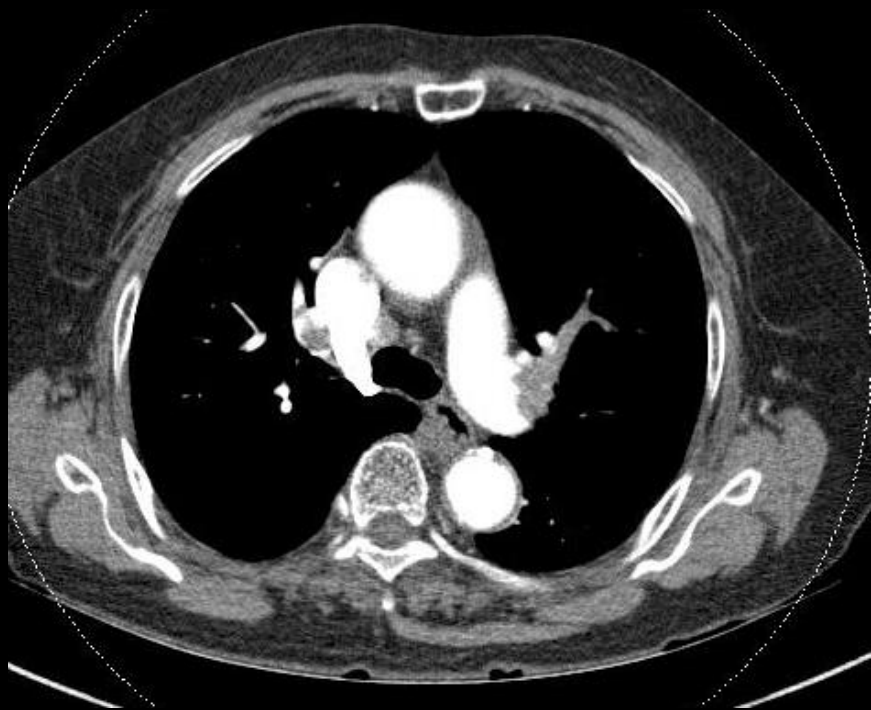
Pulmonary Thromboembolism

Impression	EF(%)	65
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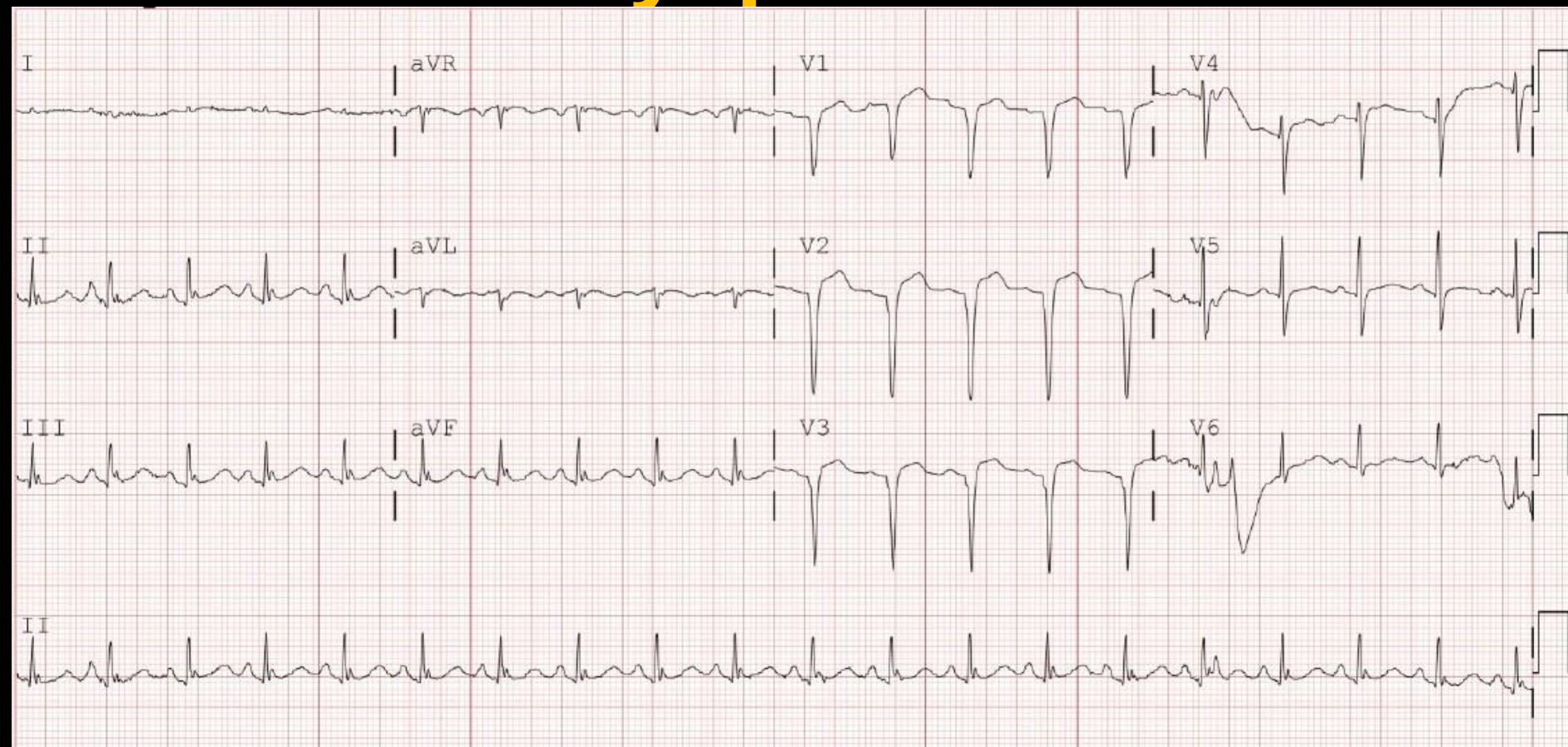
Mild resting pulmonary hypertension

Dilated RV & decreased RV contractility with sparing RV apex
c/w) PTE

Normal LV size & contractility



M / 77 Dyspnea



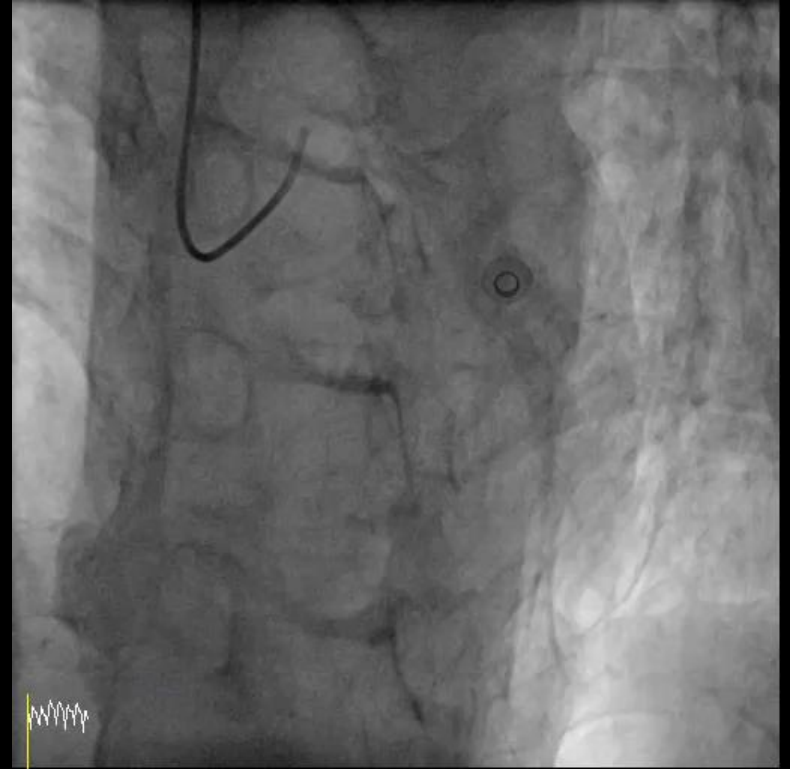
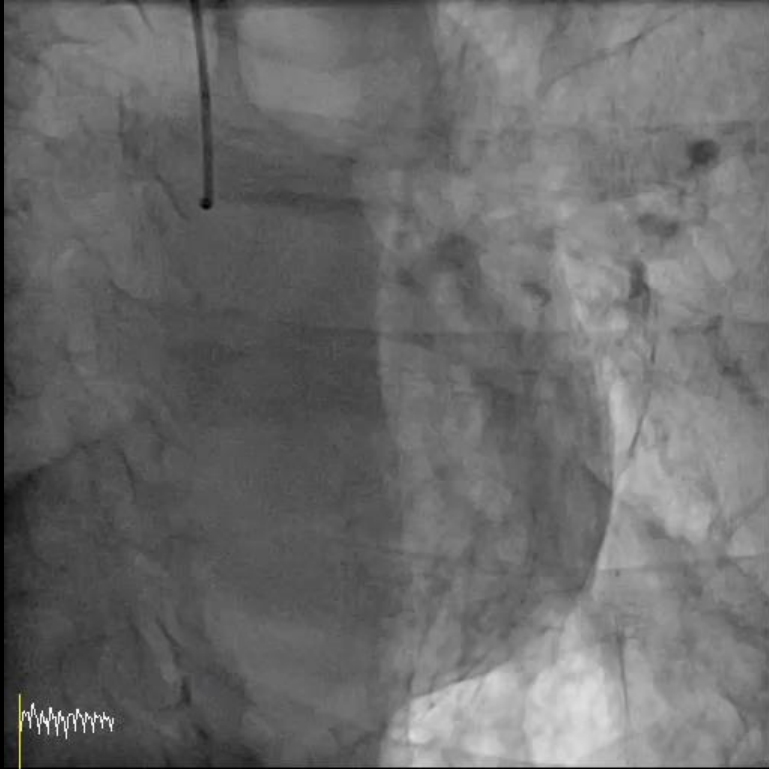


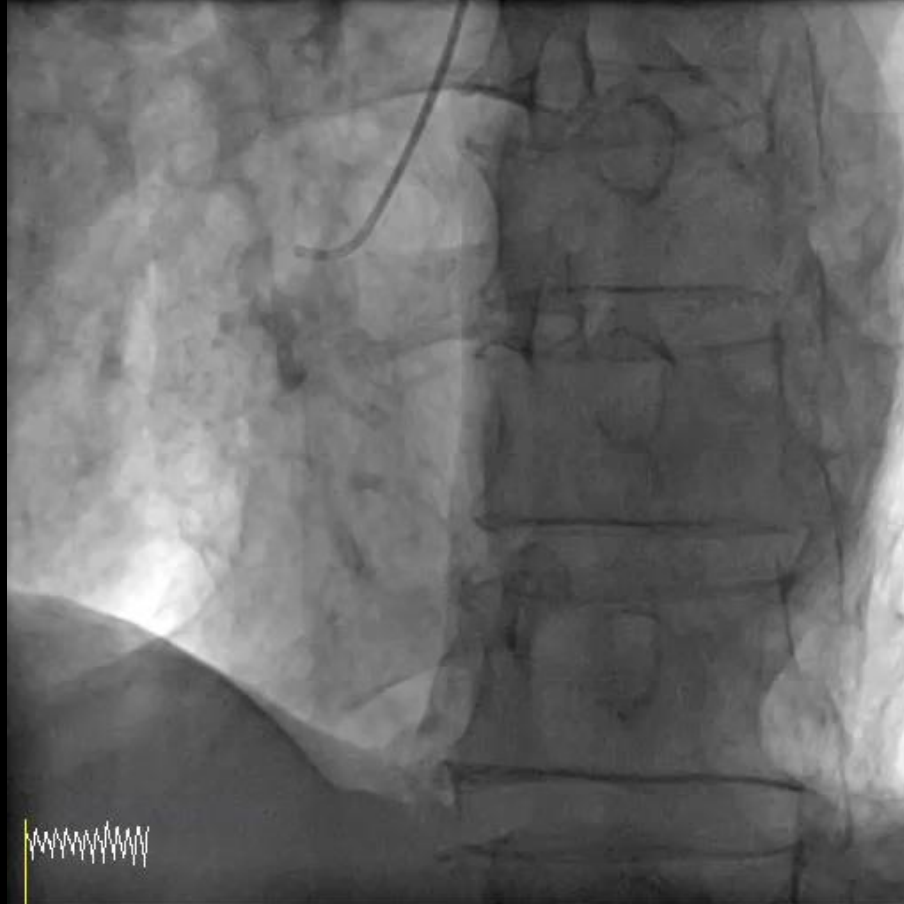
Impression

EF(%) 23

Akinesia of mid to apical LV wall with severe LV systolic dysfunction
: r/o stress induced cardiomyopathy or ischemic insult of multivessels territory

Degenerative change of AV







Stress Induced Cardiomyopathy

Impression	EF(%)	56
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Normal LV size & contractility

Degenerative change of AV with mild Ar(I/IV)

: improved LV contractility compared with prev. echo (2015.03.18)

Take Home Message

간단한 초음파 검사를 통하여 진단과 치료에
도움을 줄 수 있다.

“아는 만큼 보인다.”

**Thank you
for
your attention**