HỘI TIM MẠCH HỌC VIỆT NAM

ASE American Society of Echocardiography

Imaging in Congestion

Vietnam National Heart Association Scientific Meeting, 2017
"Contemporary approach to management of heart failure"
Thanh Hoa Province, Vietnam

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ASE Foundation

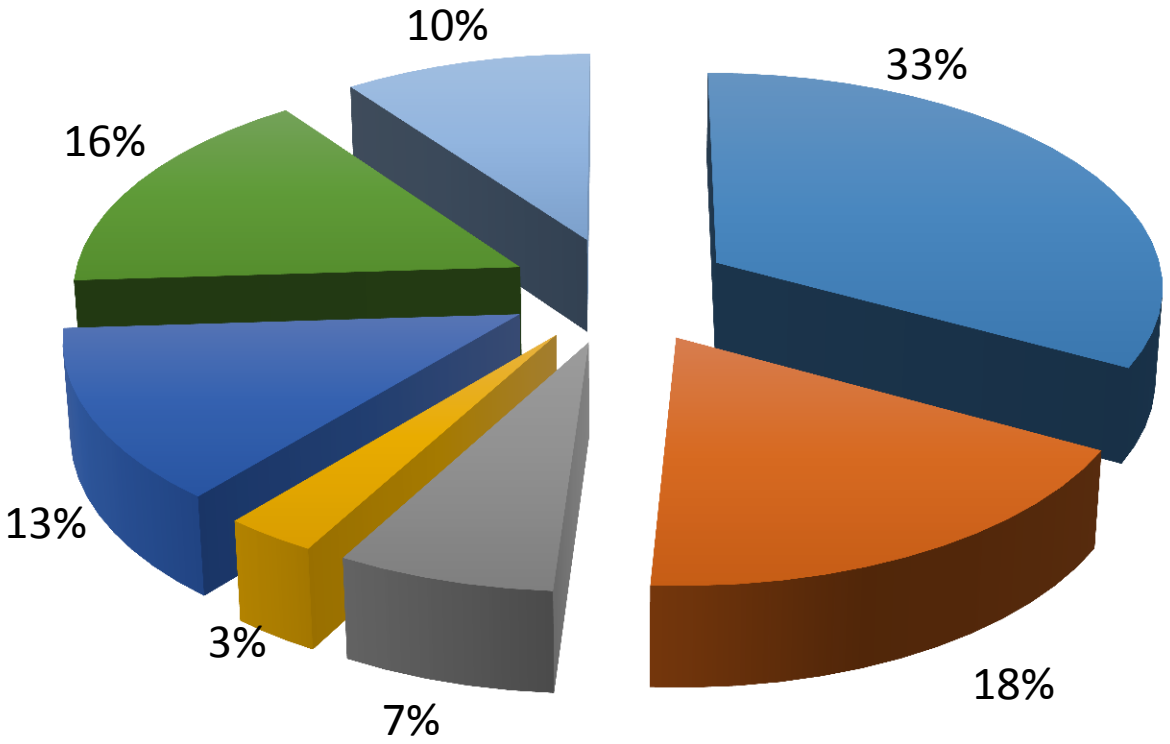
Cardiovascular Disease

- **There is a high burden of cardiovascular disease on society and is among the leading cause of mortality in Vietnam and the world.**
- **According to the World Health Organization, 17.5 million people die of cardiovascular related disease every year in the world and the number is on the rise.**

Mortality in Vietnam

Total Deaths: 520,000

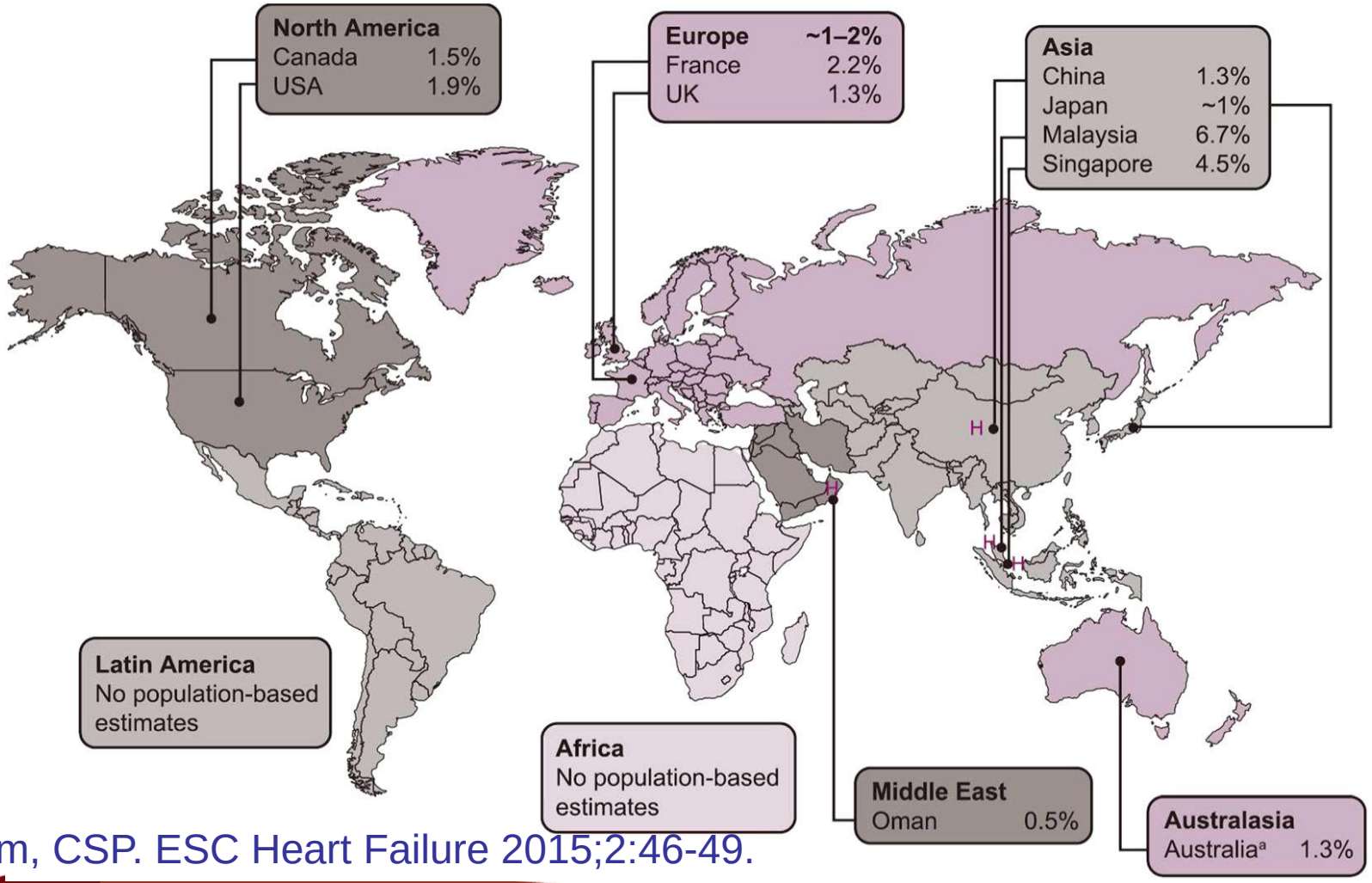
73% from Non-communicable diseases



Data: World Health Organization 2014

- Cardiovascular Disease
- Cancers
- Chronic Respiratory Disease
- Diabetes
- Other NCDs
- Communicable, maternal, perinatal, nutritional conditions
- Injuries

Prevalence of Heart Failure



Lam, CSP. ESC Heart Failure 2015;2:46-49.

HF Characteristics of Vietnamese Population

- **59% male, 41% female**
- **Mean age of admission- 59 years of age**
- **HF makes up 15% of hospitalizations per year**
- **Inpatient mortality 7% (4% in US)**

Lam, CSP. ESC Heart Failure 2015;2:46-49.

Etiology of Heart Failure

32% Ischemic heart disease

21% Non-ischemic cardiomyopathy

21% Hypertensive heart disease

18% Valvular/Rheumatic heart disease

Reyes EB, Ha JW, Firdus I, et al. Int J Cardiol 2016;223:163-167.

Risk Factors for Heart Failure

- **76% Hypertension**
- **33% Diabetes mellitus**
- **44% Dyslipidemia**
- **50% Coronary heart disease**
- **31% Smoking**

Lam, CSP. ESC Heart Failure 2015;2:46-49.

Reyes EB, Ha JW, Firdus I, et al. Int J Cardiol 2016;223:163-167.

Question:

What imaging studies should be performed on all patients with acutely decompensated heart failure?

a. **Chest x-ray**
b. **Transthoracic echocardiogram**
c. **Chest x-ray and transthoracic echocardiogram**
d. **Chest x-ray, transthoracic echocardiogram, and cardiac CT**

2013 ACCF/AHA Guideline for the Management of Heart Failure

2017 ACC/AHA/HFSA Focused Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure

Yancy CW, Jessup M, Bozkurt B, et al. Circulation 2013;128:e240-e327.

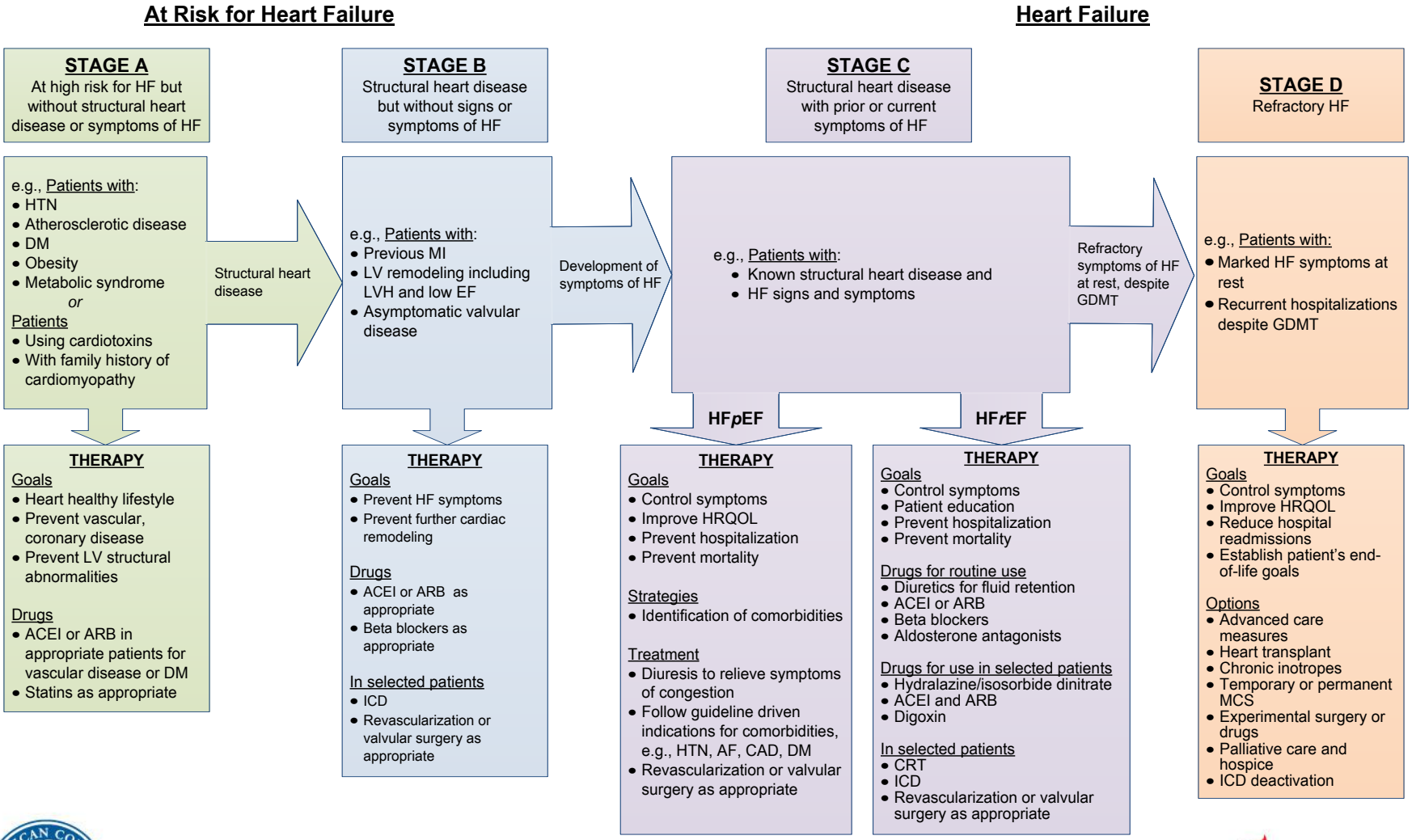
Yancy CW, Jessup M, Bozkurt B, et al. Circulation 2017;136:e137-e161.

2016 ESC Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure

The Task Force for Diagnosis and Treatment of Acute and Chronic Heart Failure of ESC

Ponikowski P, Voors AA, Anker SD, et al.
Eur Heart J 2016;37:2129-2200.

Stages, Phenotypes and Treatment of HF



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Definition of Heart Failure

Classification	Ejection Fraction	Description
I. Heart Failure with Reduced Ejection Fraction (HF*r*EF)	**≤40%**	Also referred to as systolic HF. Randomized clinical trials have mainly enrolled patients with HF*r*EF and it is only in these patients that efficacious therapies have been demonstrated to date.
II. Heart Failure with Preserved Ejection Fraction (HF*p*EF)	**≥50%**	Also referred to as diastolic HF. Several different criteria have been used to further define HF*p*EF. The diagnosis of HF*p*EF is challenging because it is largely one of excluding other potential noncardiac causes of symptoms suggestive of HF. To date, efficacious therapies have not been identified.
a. HF*p*EF, Borderline	**41% to 49%**	These patients fall into a borderline or intermediate group. Their characteristics, treatment patterns, and outcomes appear similar to those of patient with HF*p*EF.
b. HF*p*EF, Improved	**>40%**	It has been recognized that a subset of patients with HF*p*EF previously had HF*r*EF. These patients with improvement or recovery in EF may be clinically distinct from those with persistently preserved or reduced EF. Further research is needed to better characterize these patients.

Yancy CW, Jessup M, Bozkurt B, et al. Circulation 2013;128:e240-e327.

Initial and Serial Evaluation of Heart Failure Patient

Non-Invasive Cardiac Imaging

Non-Invasive Cardiac Imaging

Chest X-ray

- New or suspected HF or acute decompensated HF
- Assess heart size, pulmonary congestion, and assess for other potential etiologies of symptoms

Non-Invasive Cardiac Imaging

Transthoracic Echocardiogram- performed in the initial evaluation of heart failure. Imaging test of choice for evaluation of:

- Cardiac chamber size
- Left ventricular systolic and diastolic function
- Left ventricular global longitudinal systolic strain
- Right ventricular systolic function
- Right ventricular systolic pressure
- Valvular structure and function

Non-Invasive Cardiac Imaging

Transthoracic Echocardiogram:

Repeat assessment of EF and measurement of structural remodeling in patients who have-

- Significant change in clinical status
- Recovery from a clinical event
- Received treatment- guideline directed medical therapy
- Potential candidates for device therapy
- Serial assessment in patients receiving chemotherapy with potential cardiotoxicity

Non-Invasive Cardiac Imaging

Transthoracic Echocardiogram:

Routine repeat measurement of LV function should not be preformed in patients with-

- Absence of change in clinical status
- Absence of treatment interventions

Non-Invasive Cardiac Imaging

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Transthoracic Echocardiogram:

- Screening echocardiograms in 1st degree relatives of patients with an idiopathic dilated cardiomyopathy who are not known to be affected
- Echo recommended every 3 to 5 years

Non-Invasive Cardiac Imaging

Magnetic Resonance Imaging

- Assessment of LVEF and volumes when echocardiography is inadequate
- Assessment for a myocardial infiltrative process or scar burden
- Characterization of myocardial tissue of myocarditis, amyloidosis, sarcoidosis, Chagas disease, Fabry disease, non-compaction, hemochromatosis
- Evaluation of patients with complex congenital heart disease

Non-Invasive Cardiac Imaging

Cardiac CT

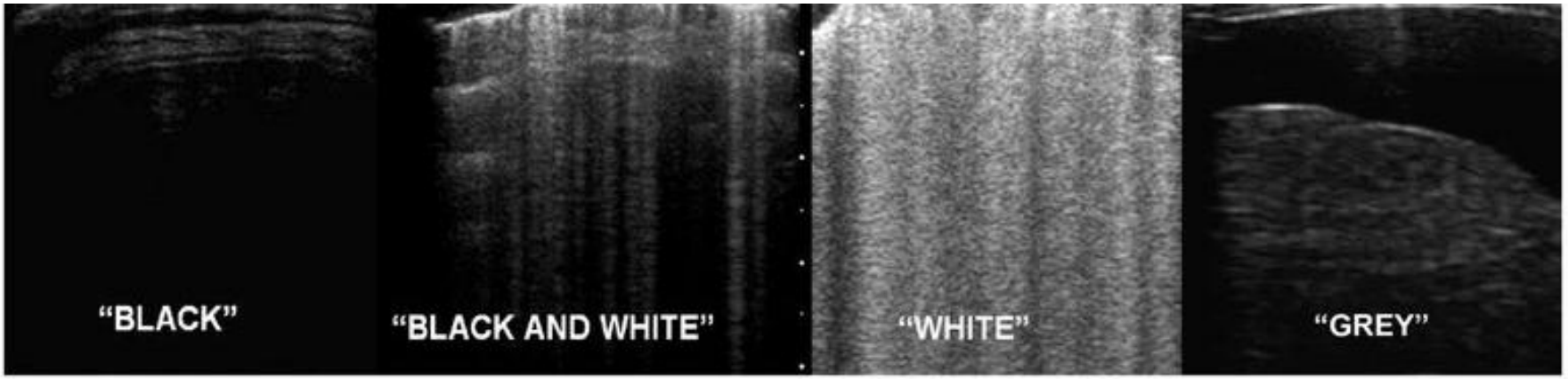
- Heart failure patients with low to intermediate pretest probability of CAD
- Patients with equivocal stress tests to rule out coronary artery disease

Thoracic Ultrasound

- Can be considered for the evaluation of pulmonary congestion and pleural effusion in patients with acutely decompensated heart failure
- Multiple B lines or comet tails are present in pulmonary congestion
- B lines are reverberation artifacts originating from water thickened pulmonary interlobular septa present in pulmonary congestion

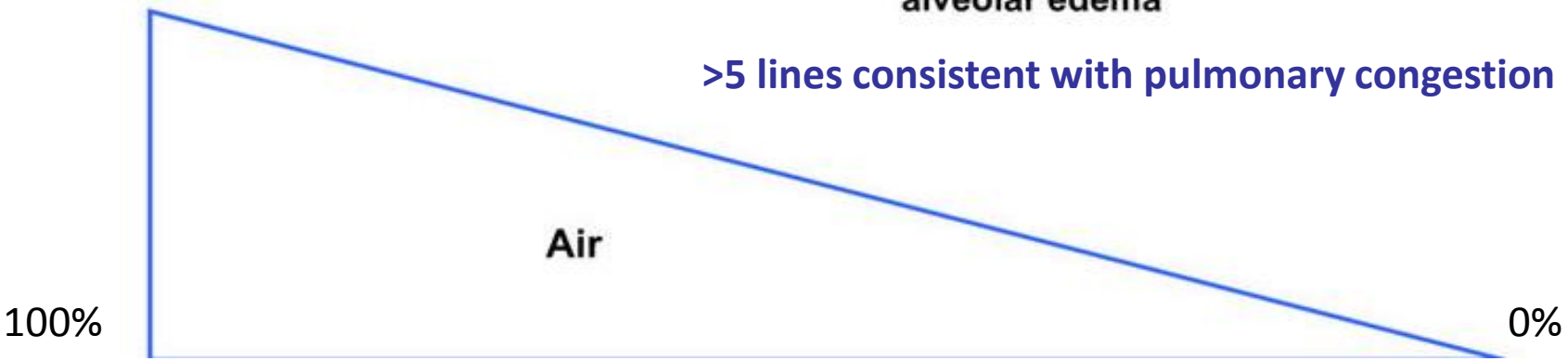
Gargani L. Cardovascular Ultrasound 2011;9:6.

Thoracic Ultrasound



Normal	Mild/moderate interstitial edema	Severe interstitial edema/ alveolar edema	Consolidation

>5 lines consistent with pulmonary congestion



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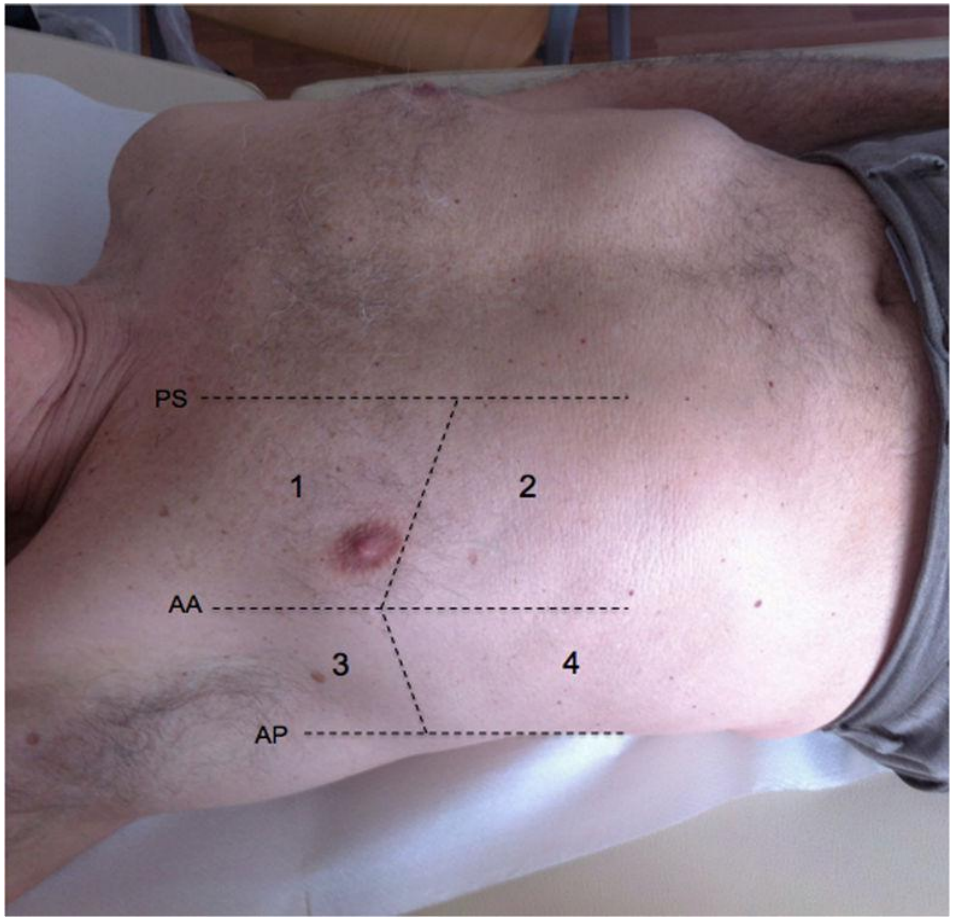
Thoracic Ultrasound



- Scan anterior right and left chest
- 2nd -5th intercostal space

Gargani L, Volpicelli G. Cardiovascular Ultrasound BioMed Central 2014;12:25.

Recommendations for Noninvasive Imaging

Recommendation	COR	LOE
Patients with suspected, acute, or new-onset HF should undergo a chest x-ray	I	C
A 2-dimensional echocardiogram with Doppler should be performed for initial evaluation of HF	I	C
Repeat measurement of EF is useful in patients with HF who have had a significant change in clinical status or received treatment that might affect cardiac function, or for consideration of device therapy	I	C
Noninvasive imaging to detect myocardial ischemia and viability is reasonable in HF and CAD	IIa	C
Viability assessment is reasonable before revascularization in HF patients with CAD	IIa	B
Radionuclide ventriculography or MRI can be useful to assess LVEF and volume	IIa	C
MRI is reasonable when assessing myocardial infiltration or scar	IIa	B
Routine repeat measurement of LV function assessment should not be performed	III: No Benefit	B

Question:

What imaging studies should be performed on all patients with new onset heart failure?

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Answer:

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Thank you for your attention!

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