The Year in Review Series: Case 3. Abnormal CXR
Case-based NBME review

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Spirometry (BTPS)		Predicted Mean	Pre Bronchodilator Actual	% Pred
FVC	L	2.57	2.02	79
FEV_1	L	2.06	1.17	57
FEV_1 / FVC	%	79	58	73

Lung Volumes (Box)		Predicted Mean	Pre Bronchodilator Actual	% Pred
TLC	L	4.53	5.80	128
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IC	L	1.93	1.41	73
FRC	L	2.60	4.39	169
ERV	L	0.64	0.76	119
RV/TLC	%	42	63	150

Diffusion		Predicted Range Mean	Pre Bronchodilator Actual	% Pred
DLCO	mL/min/mmHg	19.91	9.62	48
DLCO [Hb]	mL/min/mmHg	19.91	9.62	48

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3. Polymorphonuclear leukocyte
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Which pathologic process best describes the basis of these findings in this patient with chronic SOB?

1. Interalveolar wall destruction
2. Bronchial smooth muscle hyperresponsiveness
3. Idiopathic pulmonary fibrosis
4. Pulmonary artery smooth muscle proliferation
5. Deficiency of protease inhibitor
6. Loosely formed granulomas

On physical exam, this patient has decreased breath sounds bilaterally and is hyperresonant throughout. Cardiac exam reveals an elevated JVP, a loud second heart sound at the upper LSB and a I/VI systolic murmur at LLSB.

Which of the following most likely accounts for the cardiac findings?

1. Hypoxia-induced vasoconstriction
2. Pulmonary artery obstruction
3. Obliterative arteriopathy
4. Ventricular septal defect
5. Pulmonary venous congestion

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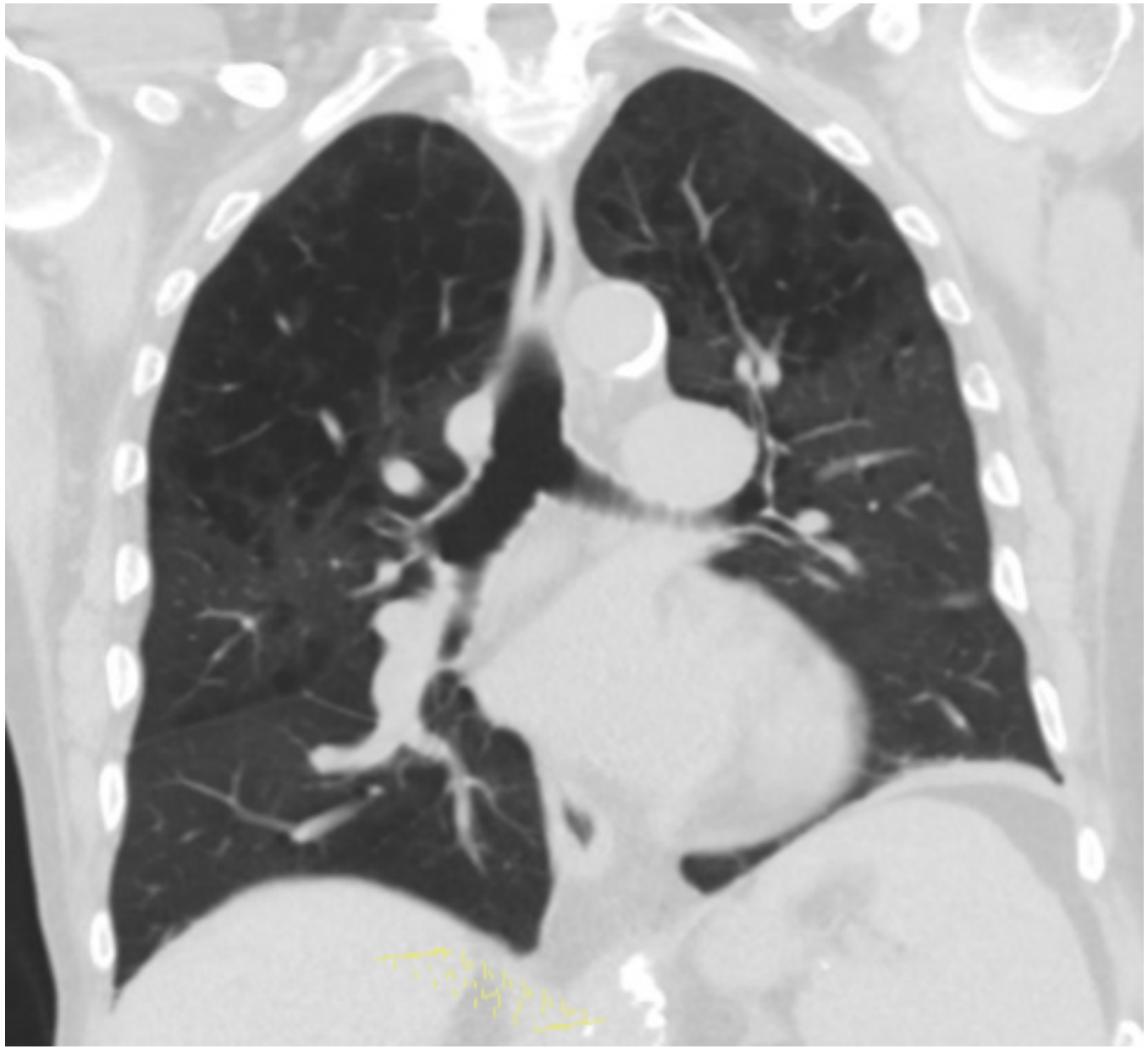

The same patient is referred for CT scan. Coronal image shown. Which of the following is most likely associated with this imaging abnormality?

A. Anti-protease deficiency
B. Toxin exposure
C. Granulomatous destruction
D. Chronic infectious illness

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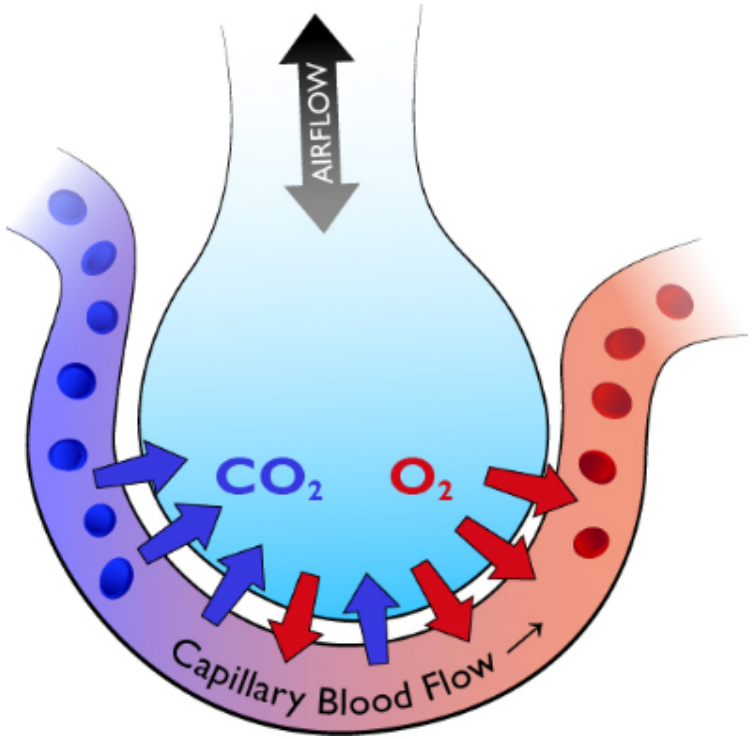

Diffusing Capacity (DLCO)
Alveolar-Interstitial-Capillary Interface

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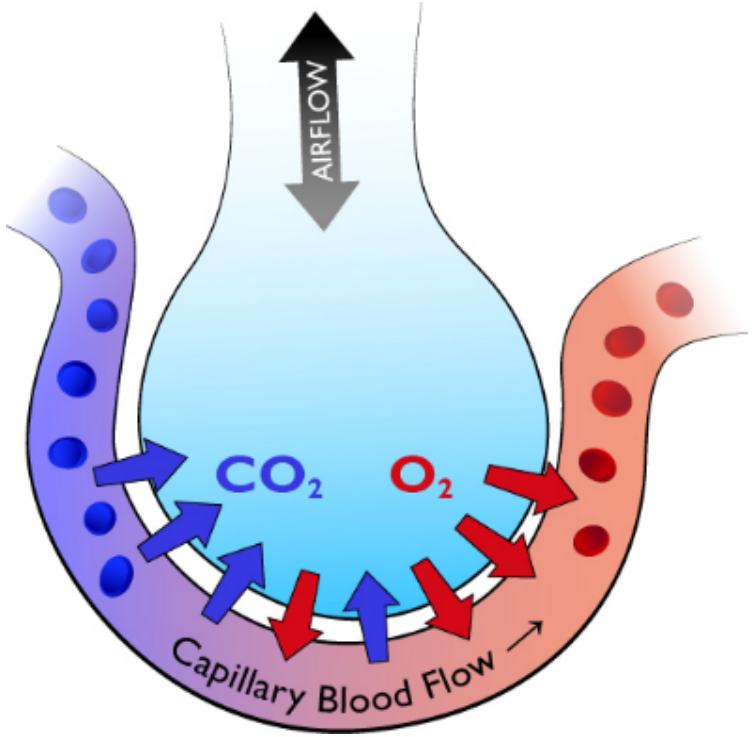

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Loss of alveolar surface area (e.g. COPD)
Disease of interstitium (e.g. IPF)
Pulmonary vascular disease

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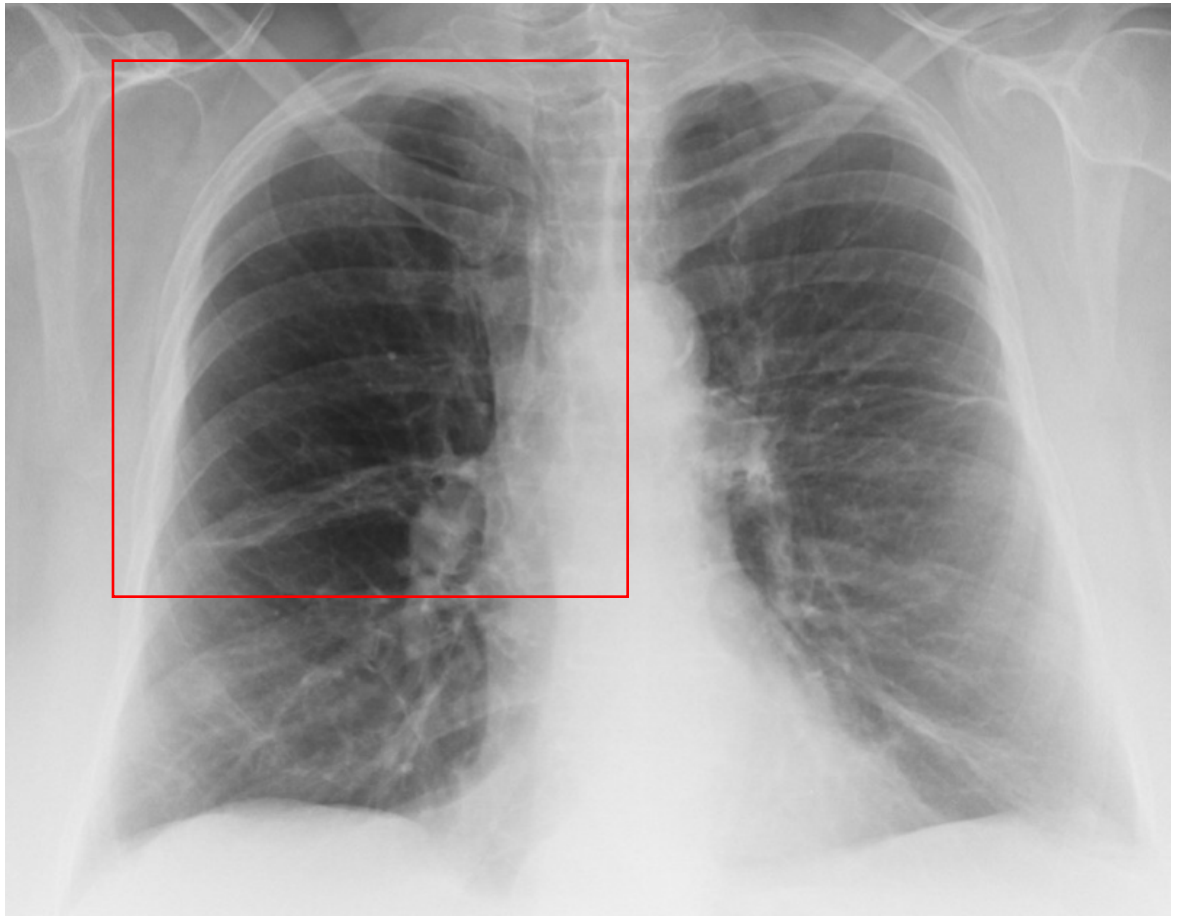

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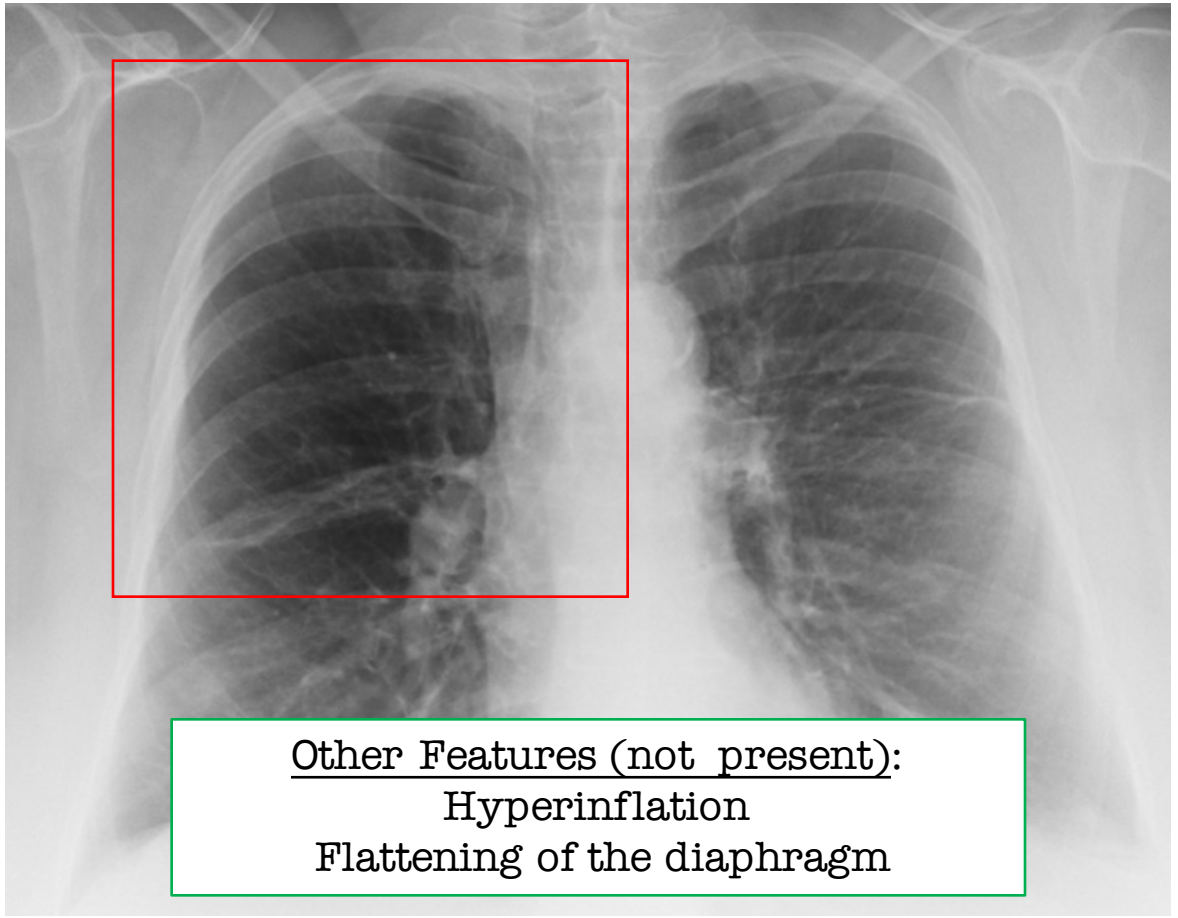

Other Features (not present):
Hyperinflation
Flattening of the diaphragm

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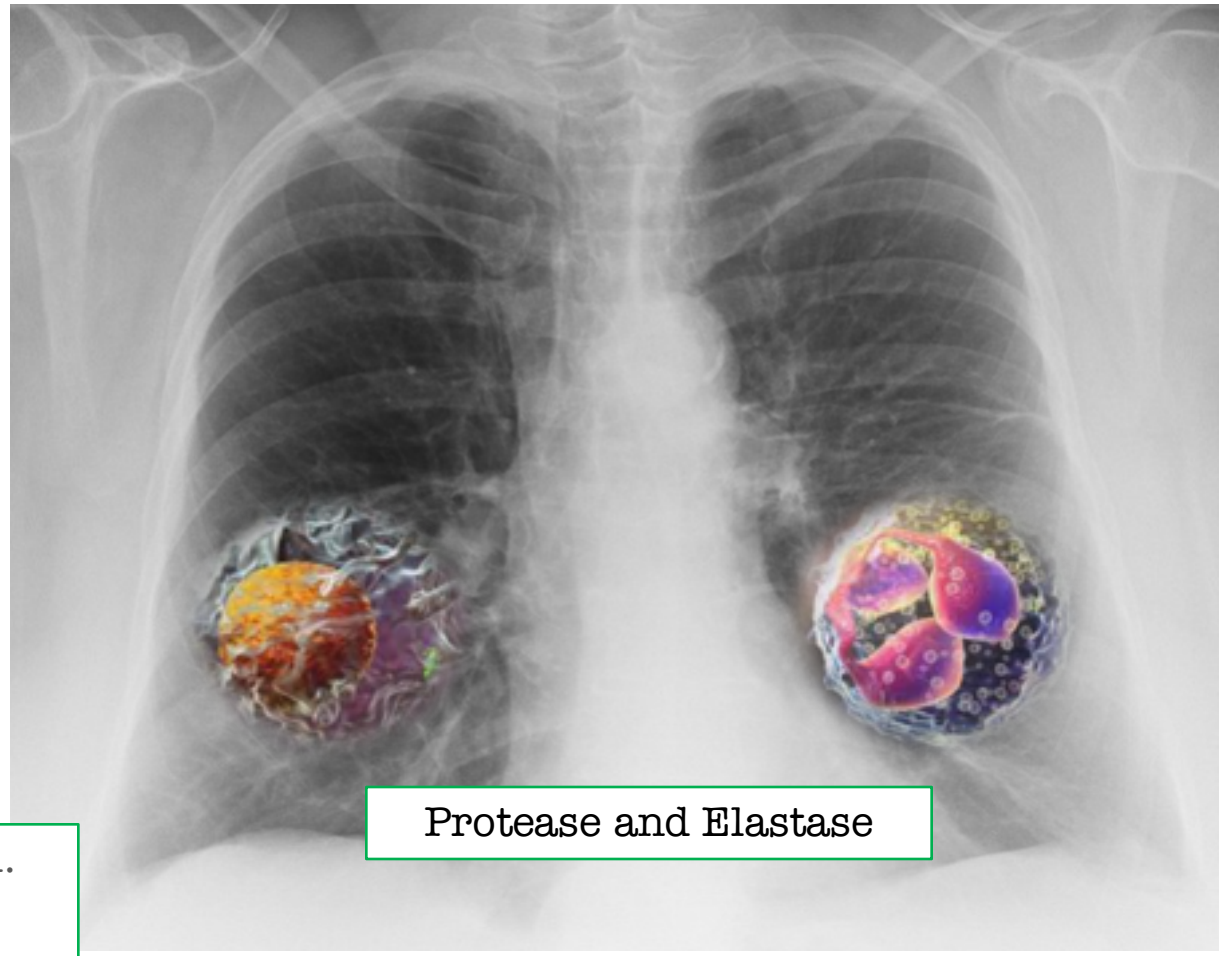

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Quick Associations

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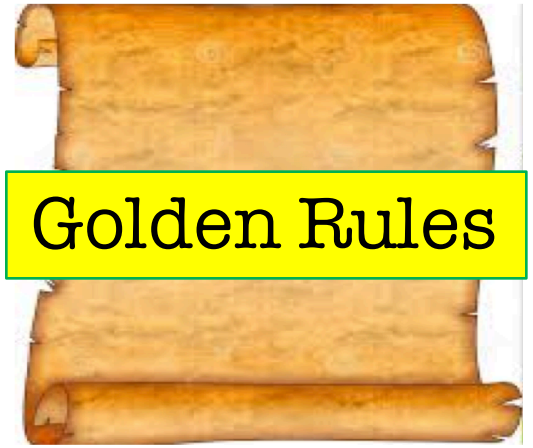

Golden Rules

Take Less Notes, Not More

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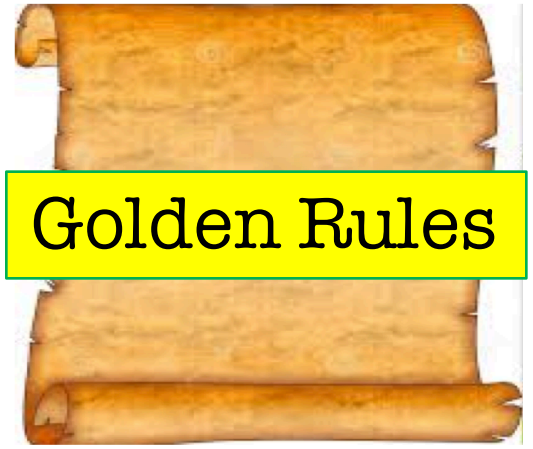

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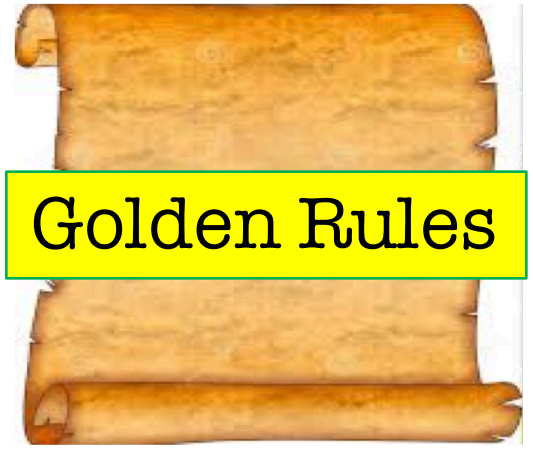

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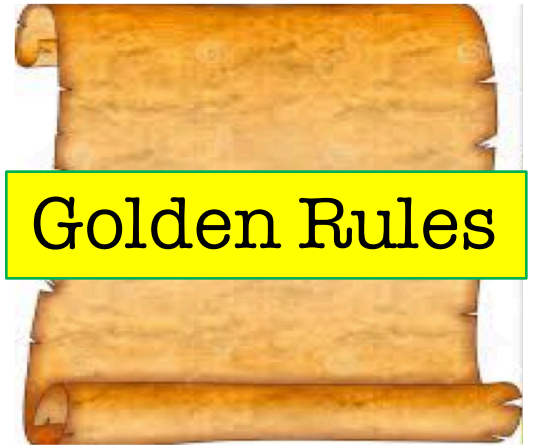

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7. Eosinophil → Asthma, Parasites, IL-5, Major Basic Protein (Charcot-Leydon crystals)

Spirometry (BTPS)		Predicted Mean	Pre Bronchodilator Actual	% Pred
FVC	L	2.57	2.02	79
FEV_1	L	2.06	1.17	57
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Lung Volumes (Box)		Predicted Mean	Pre Bronchodilator Actual	% Pred
TLC	L	4.53	5.80	128
VC	L	2.57	2.17	84
RV	L	1.96	3.63	185
IC	L	1.93	1.41	73
FRC	L	2.60	4.39	169
ERV	L	0.64	0.76	119
RV/TLC	%	42	63	150

Diffusion		Predicted Range Mean	Pre Bronchodilator Actual	% Pred
DLCO	mL/min/mmHg	19.91	9.62	48
DLCO [Hb]	mL/min/mmHg	19.91	9.62	48

Patient presents with chronic dyspnea. Studies obtained. Which cell type most contributed to the constellation of findings observed in these studies?

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1. Interalveolar wall destruction
2. Bronchial smooth muscle hyperresponsiveness
3. Idiopathic pulmonary fibrosis
4. Pulmonary artery smooth muscle proliferation
5. Deficiency of protease inhibitor
6. Loosely formed granulomas

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This is the pathologic description of emphysema

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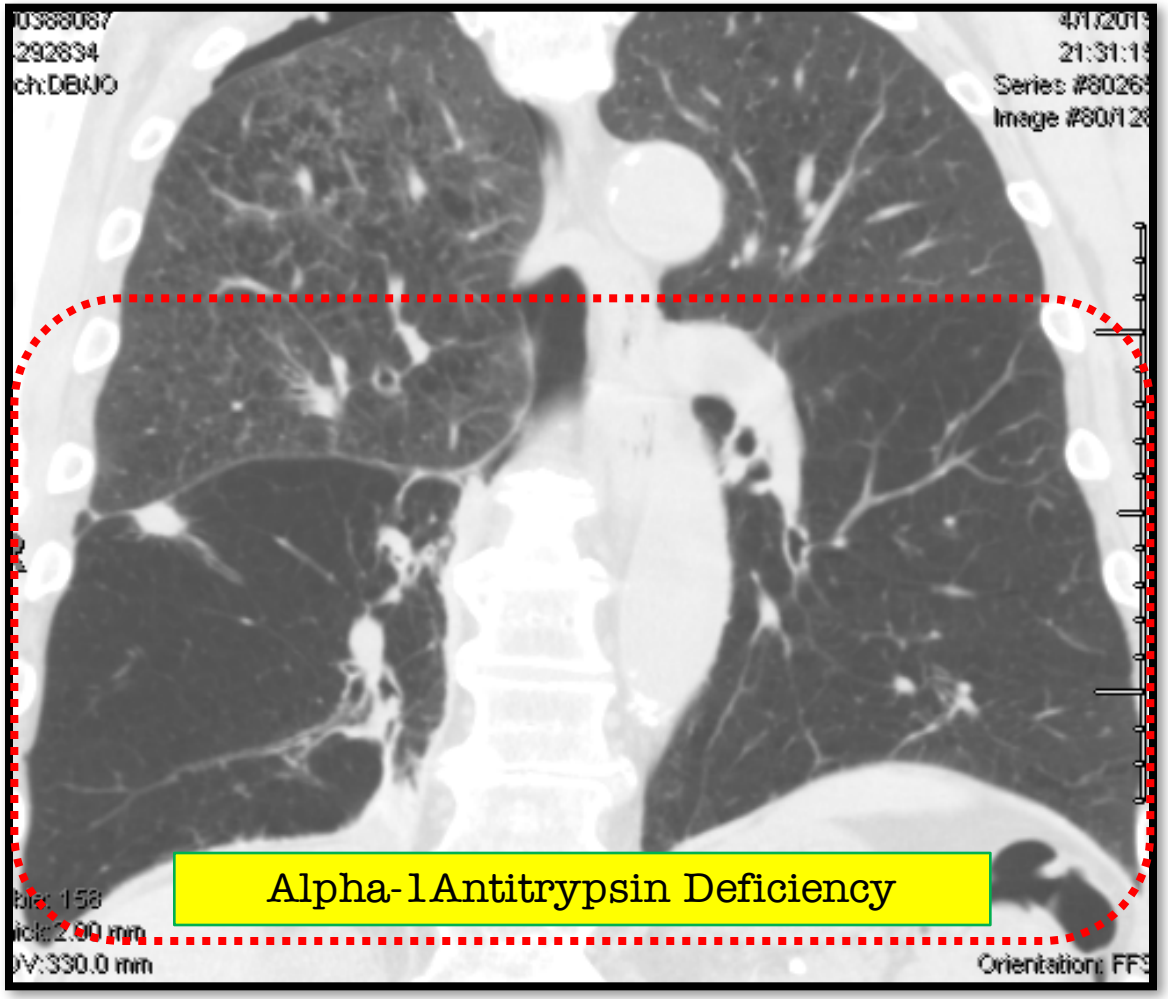
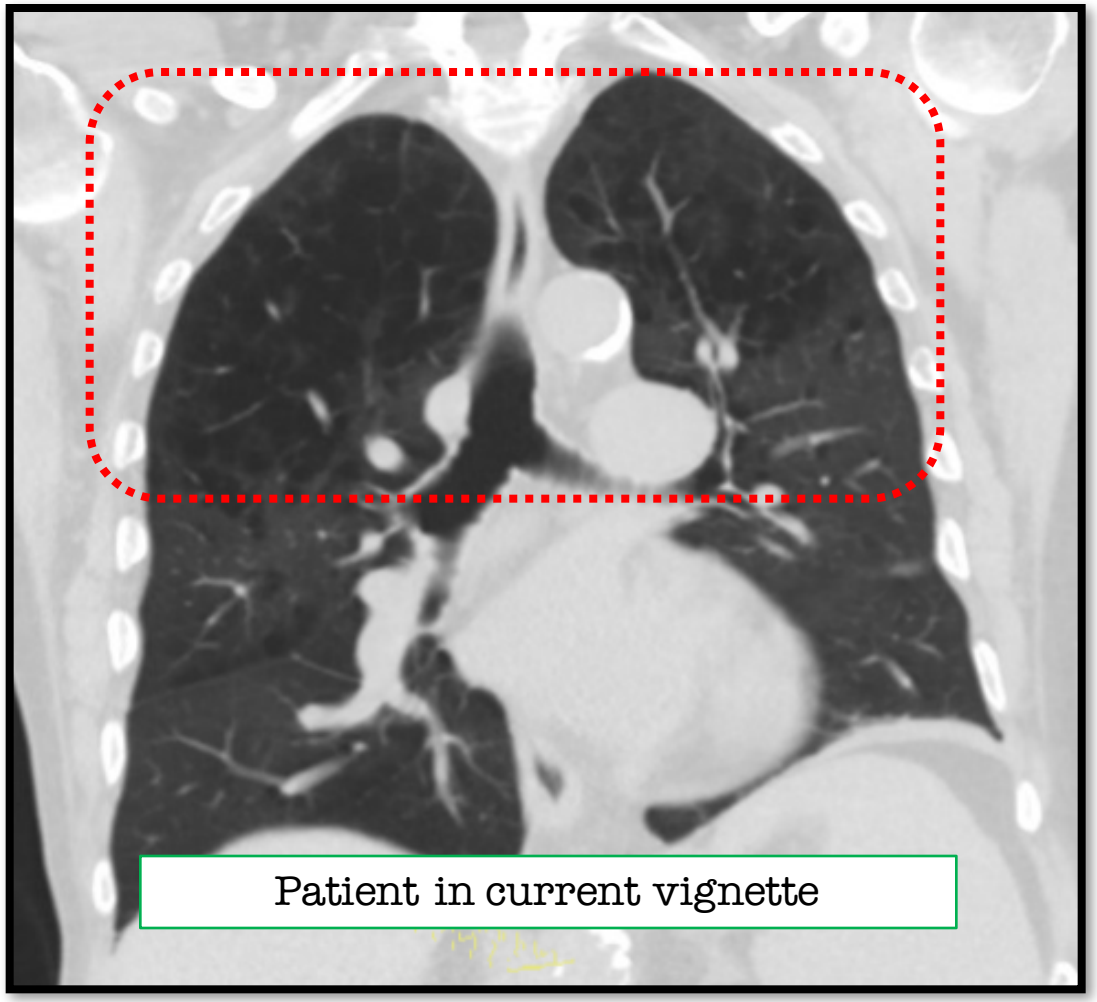
Which pathologic process best describes the basis of these findings in this patient with chronic SOB?

2. Bronchial smooth muscle hyperresponsiveness: asthma
3. Idiopathic pulmonary fibrosis
4. Pulmonary artery smooth muscle proliferation: PPH, Diffuse Systemic Sclerosis

6. Loosely formed granulomas: hypersensitivity pneumonitis (well formed in sarcoid)



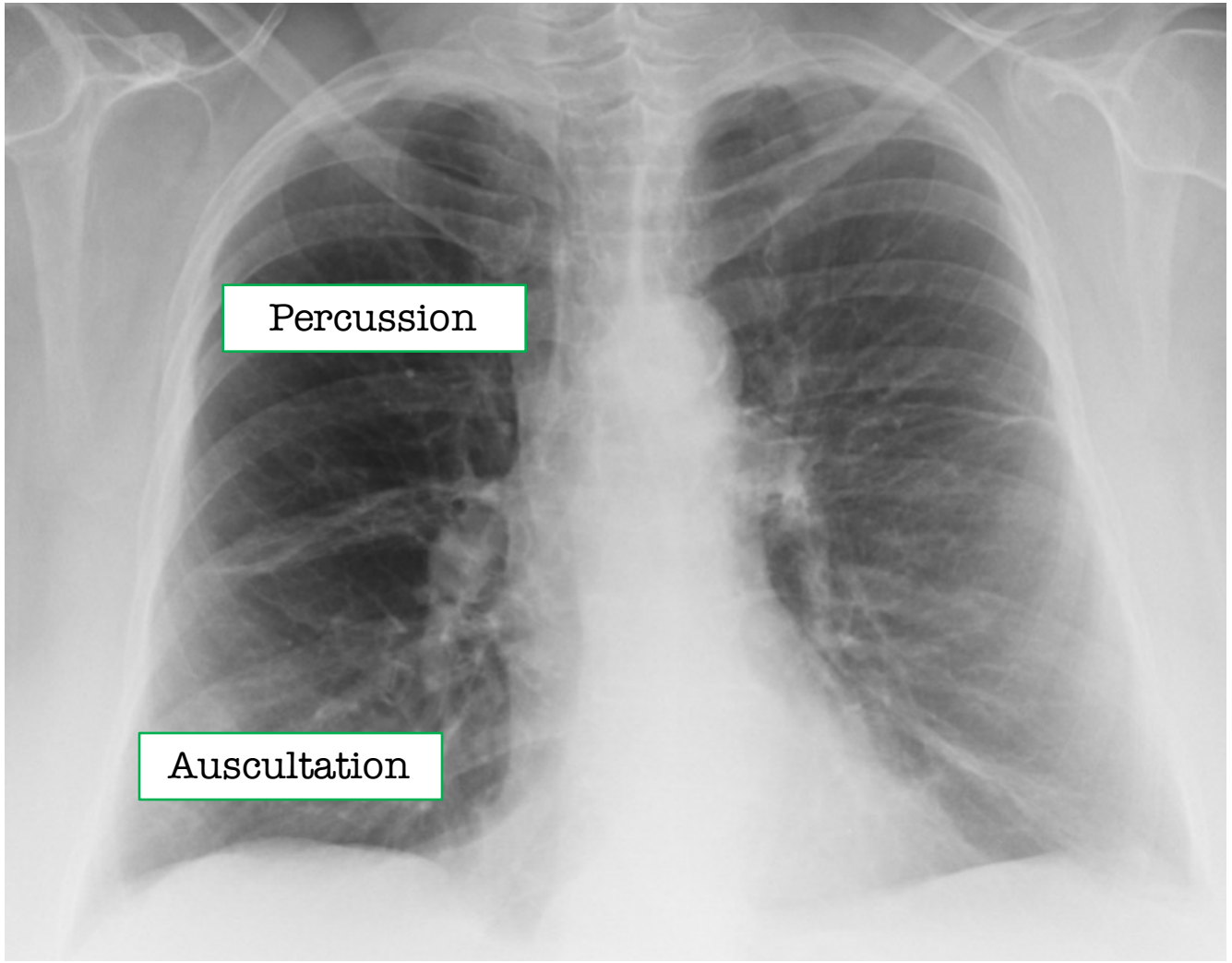


5. Deficiency of protease inhibitor: A1AT, basilar involvmement, panacinar

On physical exam, this patient has decreased breath sounds bilaterally and is hyperresonant throughout. Cardiac exam reveals an elevated JVP, a loud second heart sound at the upper LSB and a I/VI systolic murmur at LLSB.

Which of the following most likely accounts for the cardiac findings?

COPD: ↓ Breath Sounds and Hyperresonance



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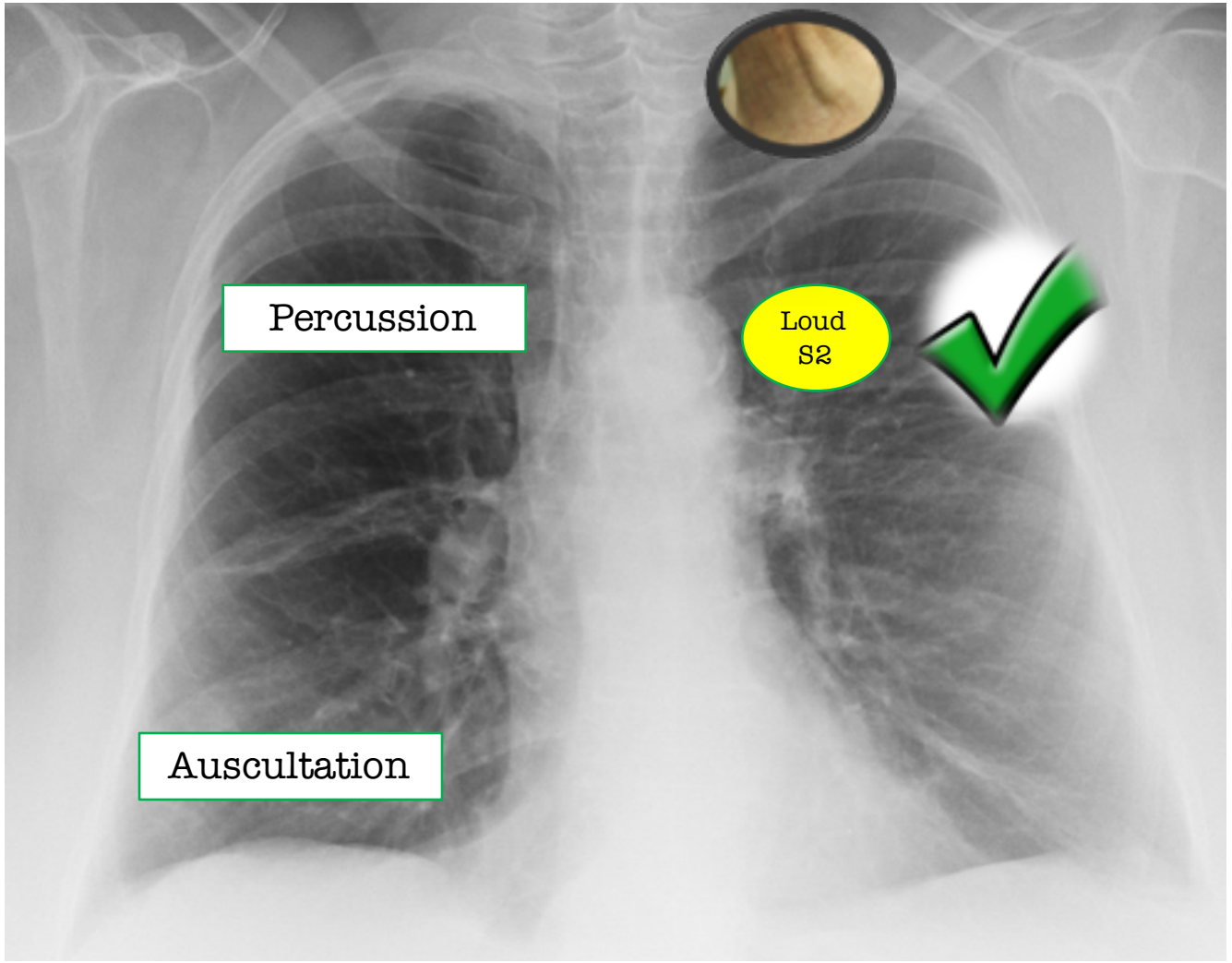

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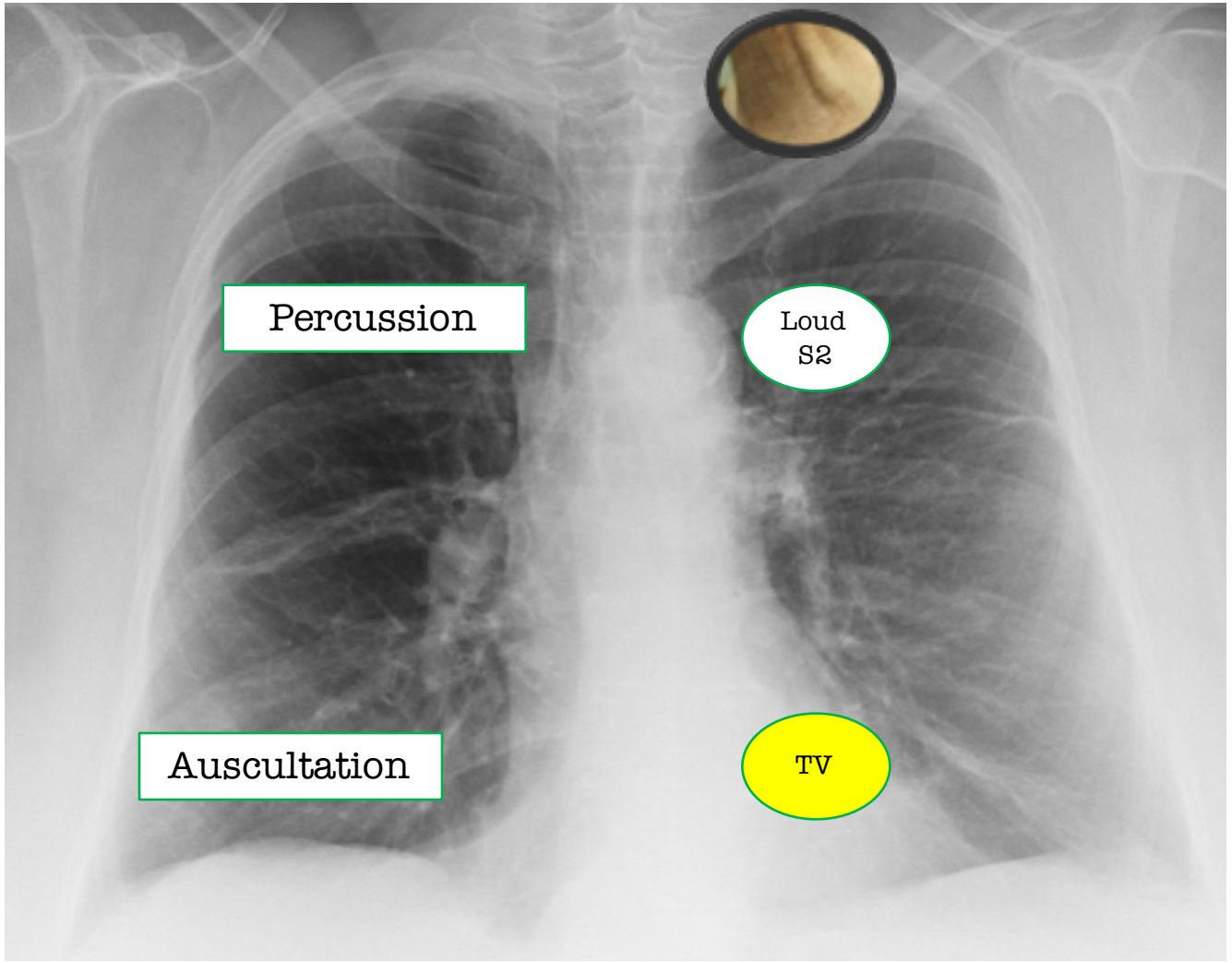

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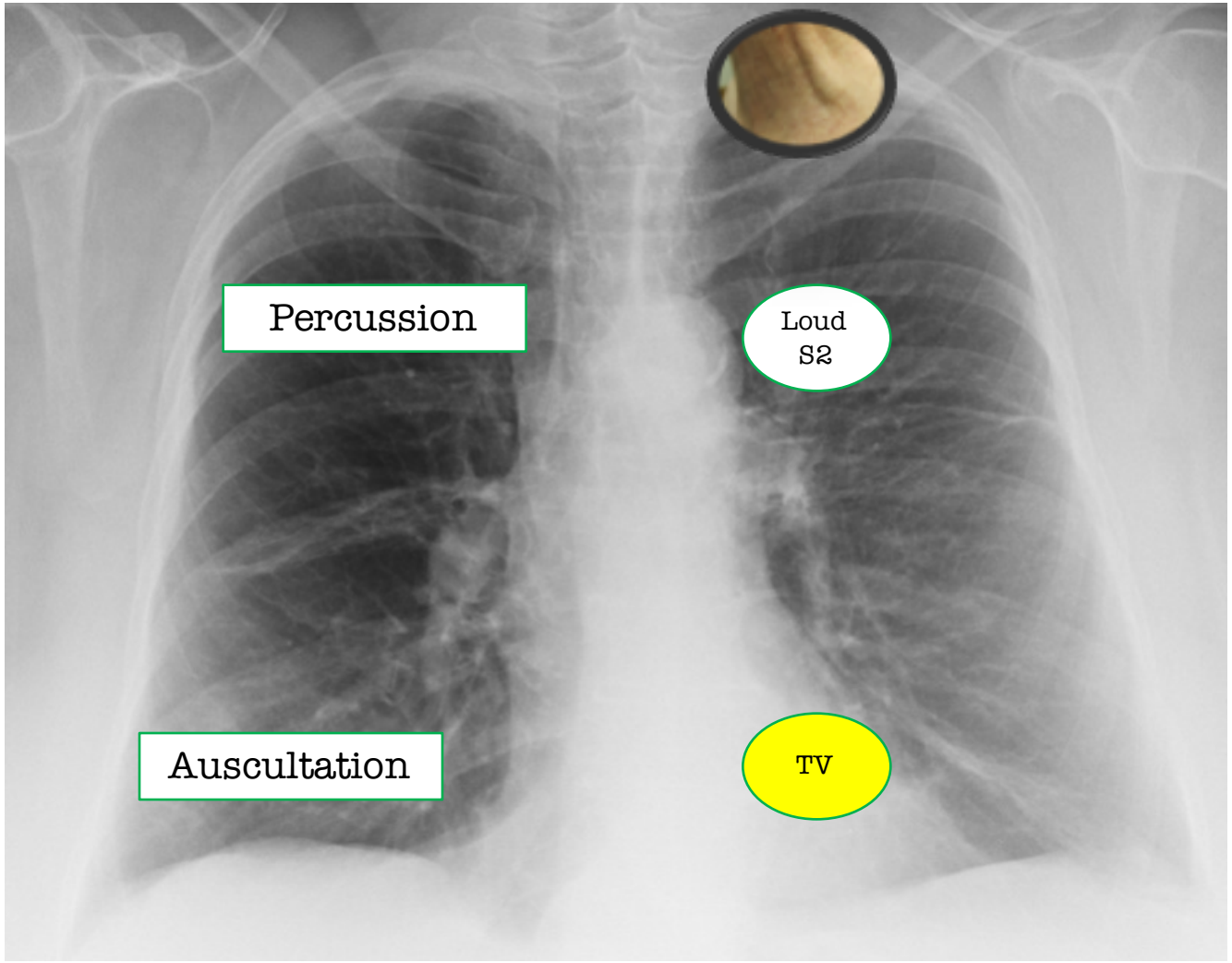
TR is frequently reported in the setting of pulmonary HTN.

Etiology: 2° to dilated RV annulus
Purpose (USMLE): deceipt



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PFT → COPD

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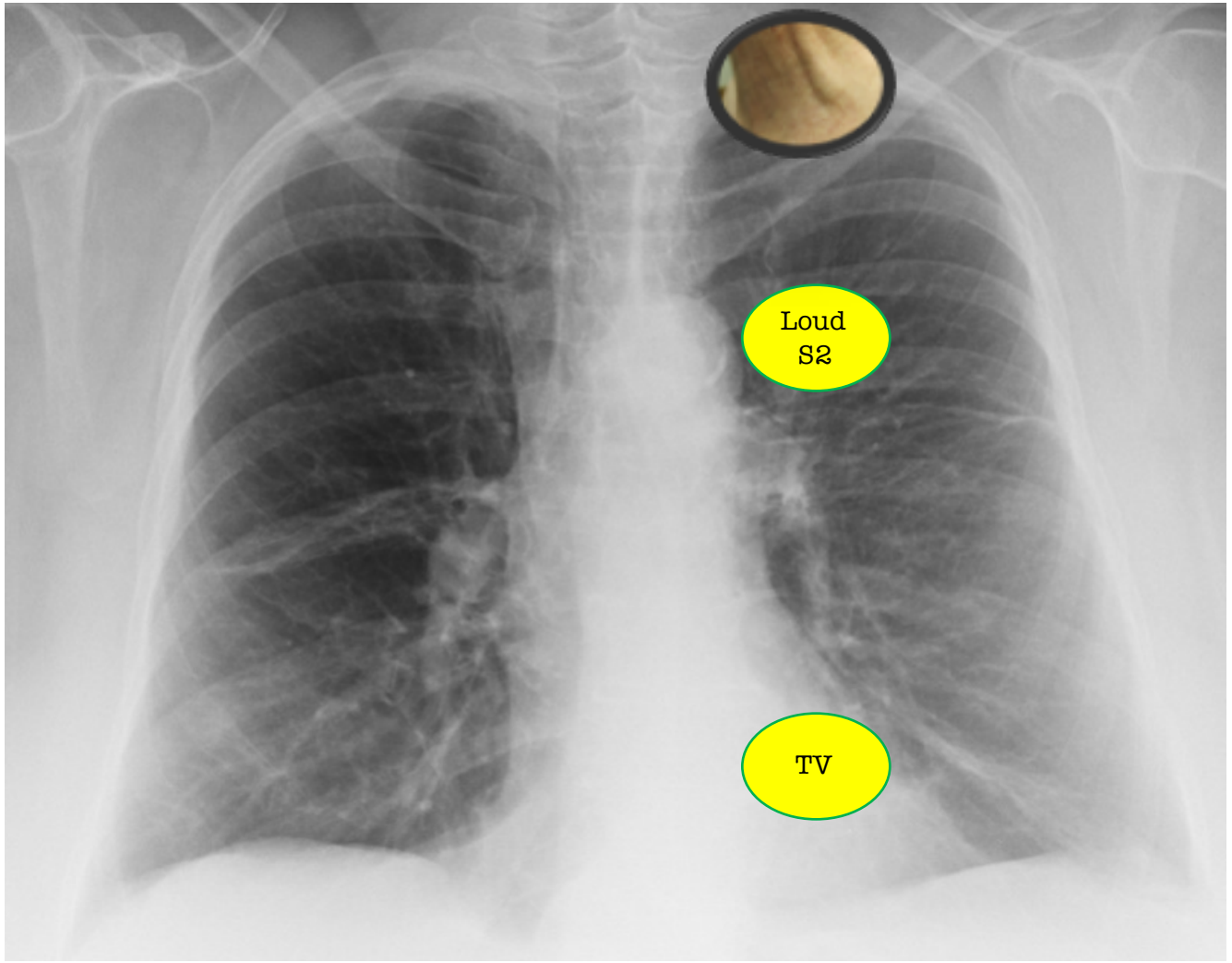
2. Pulmonary artery obstruction
3. Obliterative arteriopathy
4. Ventricular septal defect
5. Pulmonary venous congestion



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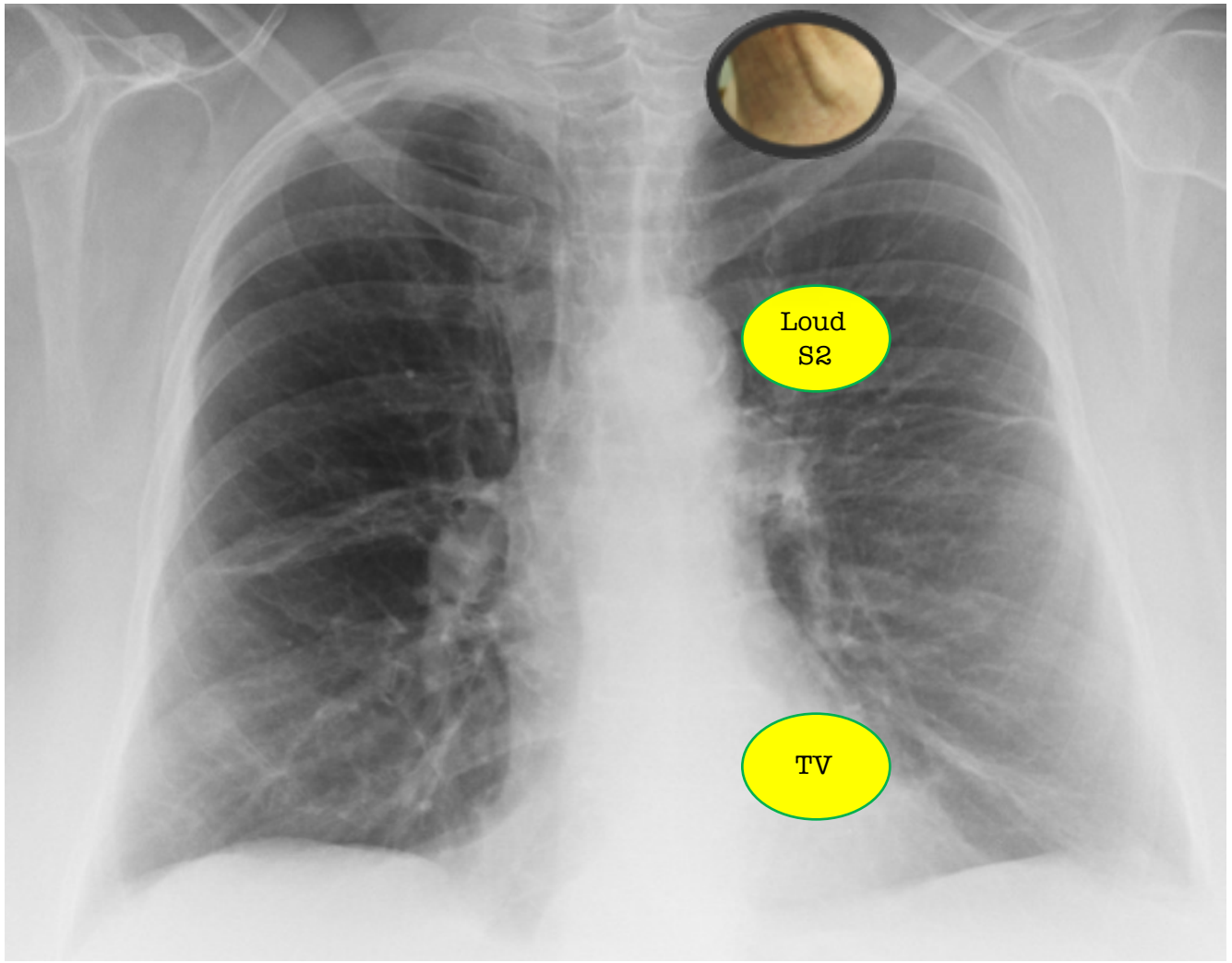

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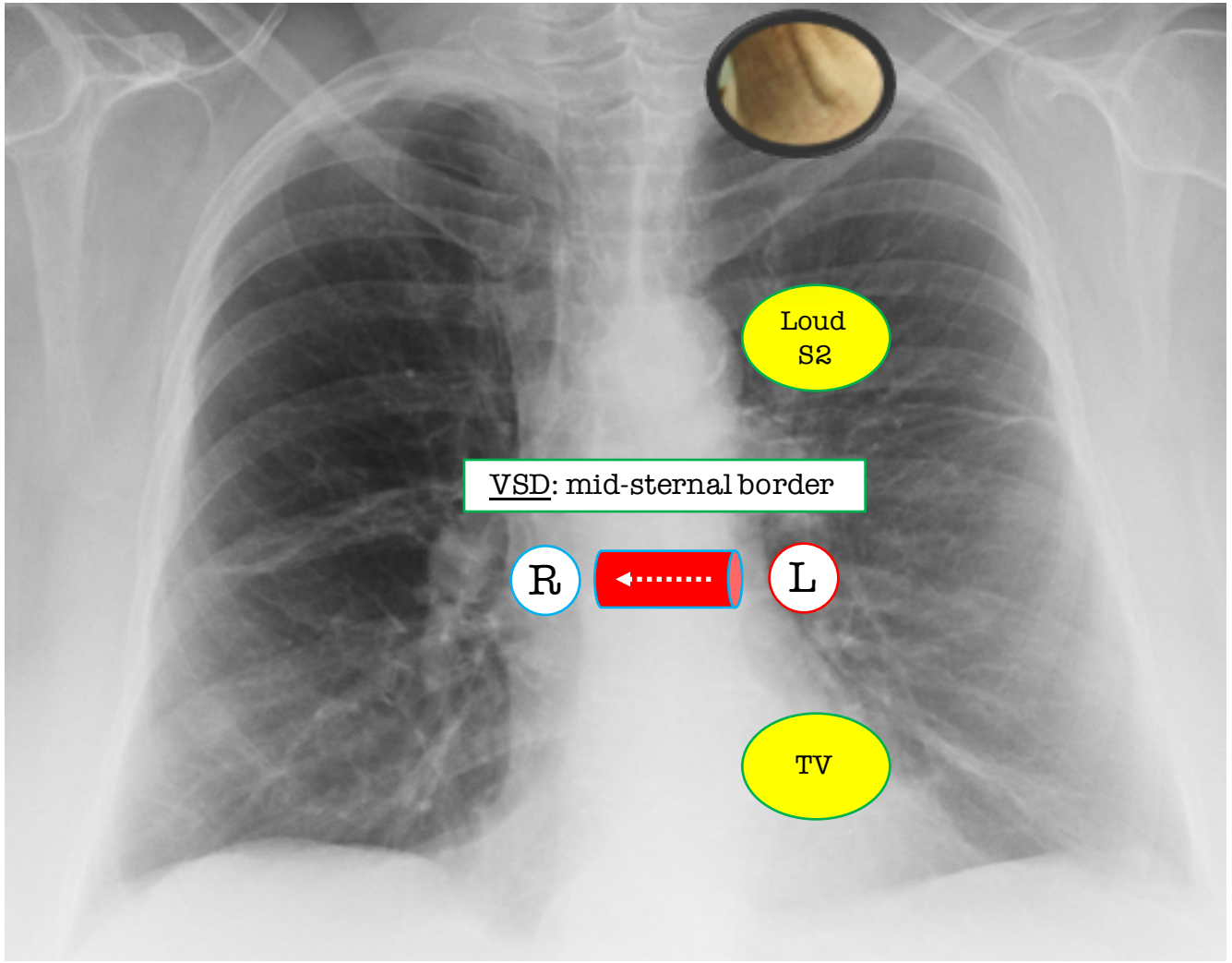
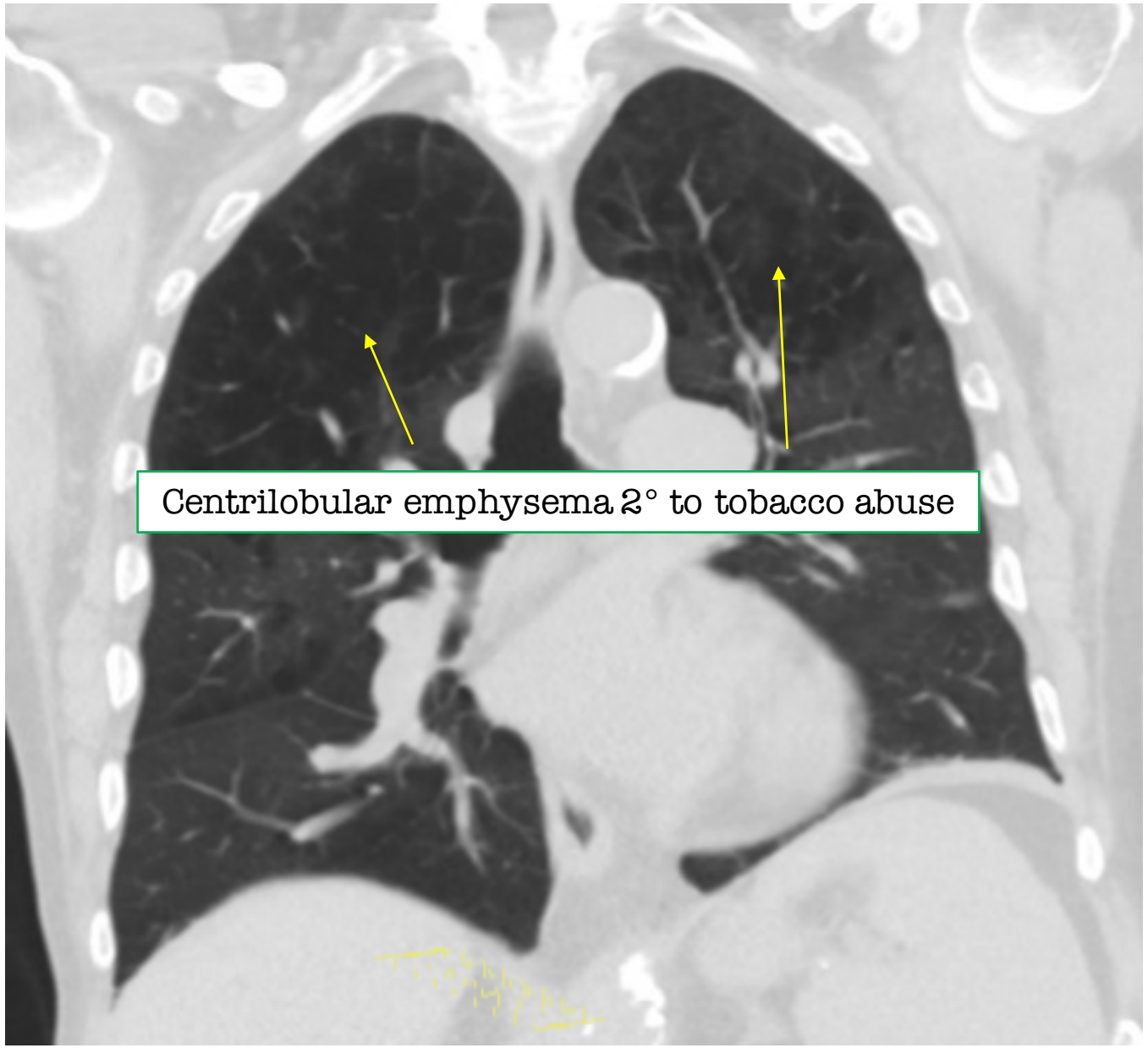


4. Ventricular septal defect: mid-LSB, holosystolic

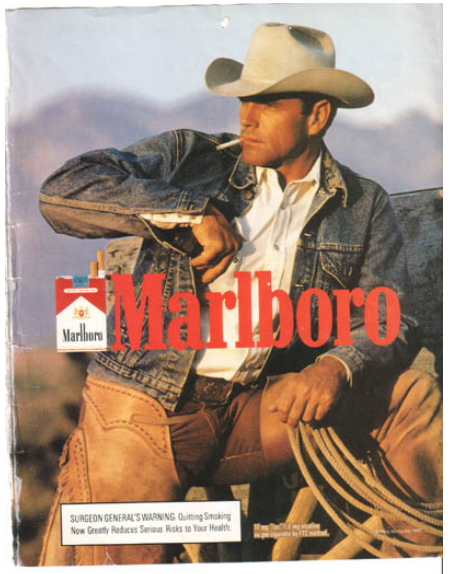
L → R shunt can cause pulm HTN with TR and ↑ JVP

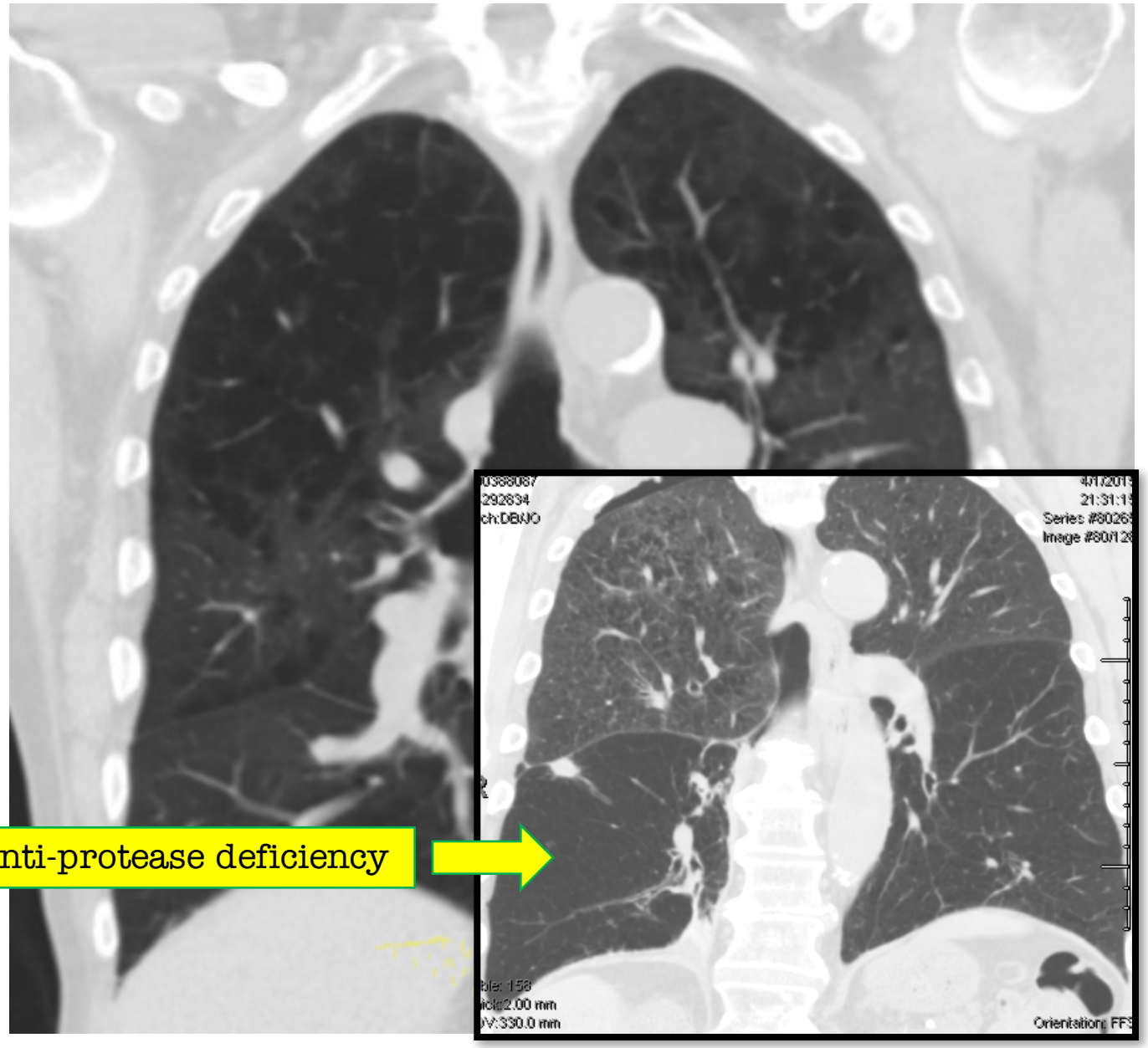


Centrilobular emphysema 2° to tobacco abuse

The same patient is referred for CT scan. Images shown. Which of the following is most likely associated with this imaging abnormality?

A. Anti-protease deficiency
B. Toxin exposure
C. Granulomatous destruction
D. Chronic infectious illness





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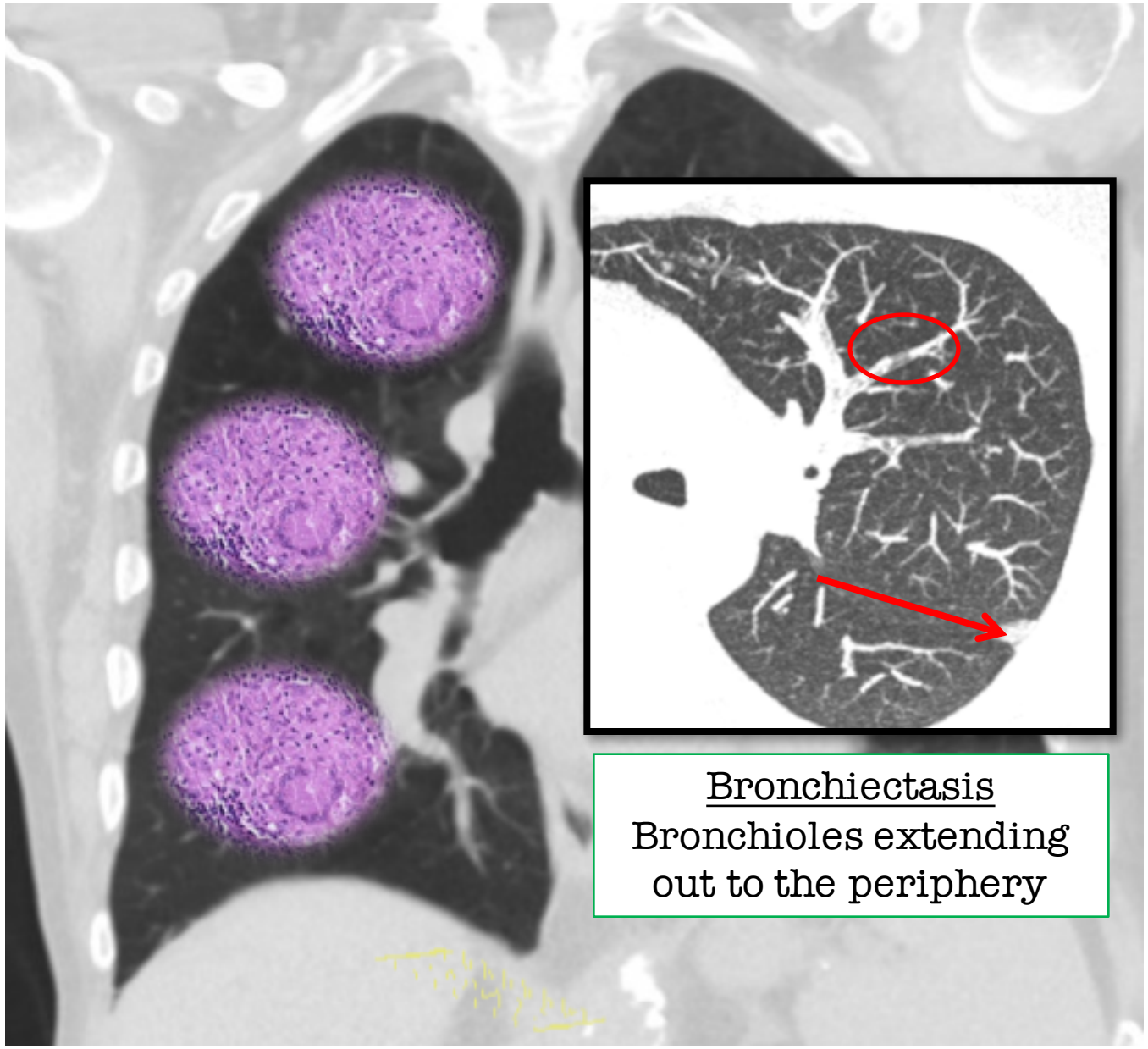

<u>Bronchiectasis</u>
Bronchioles extending out to the periphery

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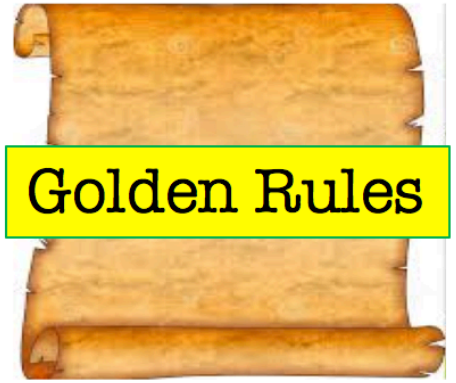
The Year in Review Series: Case 3. Abnormal CXR
Case-based NBME review



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Practice Making Quick Associations

Howard J. Sachs, MD
www.12DaysinMarch.com
E-mail: Howard@12daysinmarch.com