An Approach to Acute Dyspnea

Diagnostic Framework

Hypoxemia	Hypercapnia	Acidemia	Poor O_2 Delivery (without hypoxemia)	Miscellaneous
Pulmonary edema Cardiogenic Non-cardiogenic Pneumonia* Pulmonary embolism* Pleural effusion* COPD exacerbation Interstitial lung disease* Pneumothorax Atelectasis* Mucus plug	COPD exacerbation Asthma exacerbation Acute neuro/ neuromuscular disease Myasthenia gravis Transverse myelitis Guillain-Barré syndrome	Ketoacidosis Lactic acidosis	Anemia* Low output heart failure Obstructive shock Massive PE* Tamponade* Tension pneumothorax	Coronary artery disease ("angina-equivalent") Anxiety Pain

* Can be caused either directly or indirectly by lung cancer and/or its treatment.

How to assess a patient with acute dyspnea?

HPI, PMH, social history

Vitals

Focused physical exam (e.g. cardiac, pulmonary, and extremity exams)

Chest X-ray

Depending on situation, additional data could include:

A more complete physical exam

CBC, chemistry panel, d-dimer, BNP, procalcitonin, lactate, ketones, ABG

ECG

Focused bedside ultrasound or formal echocardiogram

CT scan thorax

	Pulmonary Exam	Chest X-ray	Additional Supportive Features From Initial Evaluation	Diagnostic Next Steps
Pneumonia	Focal crackles	Focal opacity/opacities	• Symptoms: Cough, fever • Labs: Leukocytosis, ↑ procalcitonin	Blood +/- sputum cultures
Pulmonary Edema	Diffuse coarse crackles	Diffuse alveolar opacities	<u>Supportive of a cardiogenic cause:</u> CV risk factors, recent weight gain, symmetric leg edema, S3, ↑ JVP, dilated IVC and ↓ EF on bedside ultrasound, ↑ BNP, abnormal ECG	If cardiogenic: Consider serial troponin Formal echocardiogram If non-cardiogenic:
ILD	Diffuse fine crackles	Diffuse interstitial opacities	Uncommon	• Review meds and exposure history: (e.g. home, occupation, hobbies, travel, animals) • Chest CT
Pleural effusion	Unilaterally decreased breath sounds and dullness to percussion	Pleural effusion	-	Thoracentesis
Pneumothorax	Unilaterally decreased breath sounds and hyperresonance to percussion	Pneumothorax	Pleuritic chest pain	If first time occurrence, additional work-up usually unnecessary.
COPD/Asthma exacerbation	• Diffusely decreased breath sounds • Wheezing	• No opacities • May or may not have hyperinflation	• Established history of COPD or asthma • Smoking history (for COPD)	• Check peak flow (for asthma) • Otherwise, rule out alternative explanations (i.e. there is no confirmatory diagnostic test) • Diagnostic trial of bronchodilators
Pulmonary Embolism	Normal	Normal	• Pleuritic chest pain • Hypoxemia • PE risk factors (e.g. malignancy, recent hospitalization or immobilization, history of prior DVT/PE) • Evidence of DVT on exam	If clinical suspicion is low: d-dimer If clinical suspicion is high: CT angiogram thorax (estimate clinical suspicion with Wells score)

Among patients presenting with acute dyspnea, the presence or absence of hypoxemia is minimally diagnostically helpful since most causes of dyspnea can present either with or without it.

However, the table to the right lists those diagnoses to consider when a patient who presents with acute dyspnea is found to have a normal pulmonary exam, *including normal oxygenation*, and a normal chest X-ray.

	Relevant Diagnostic Test Finding(s)	Diagnostic Next Steps
Pulmonary embolism	**PE seen on CTA thorax**	• Age-appropriate cancer screening • Consider whether patient warrants hypercoagulability work-up (most don't)
Myocardial ischemia (a.k.a. acute coronary syndrome)	• Exertional chest pain • CV risk factors • Elevated troponin • Dynamic ECG changes	• If probability of ACS is low-mod: Stress test (perfusion scan vs. dobutamine stress echo) • If probability of ACS is high: Cardiac cath
Severe anemia	**Modeately-severely low hemoglobin** (Note: mild anemia – Hb > ~9g/dL – is usually insufficient to be primary cause of dyspnea)	Work-up anemia
Metabolic acidosis	• Low "bicarb" (CO_2) on chem panel • Metabolic acidosis on ABG or VBG	Check lactate, ketones
Hypoventilation	**Respiratory acidosis with normal A-a gradient on ABG**	Consider causes of hypoventilation (e.g. neuromuscular disease, diaphragmatic paralysis) (Note: Obesity-hypoventilation syndrome and sedative overdose usually causes hypoventilation w/o dyspnea)
Pericardial Tamponade	• Pulsus paradoxus • Pericardial effusion seen on chest X-ray or bedside ultrasound	• Formal echocardiogram • Immediate cardiology consult (patient may need pericardiocentesis)
Anxiety	All other diagnoses ruled out (i.e. anxiety is a "diagnosis of exclusion")	• Consider situational reasons for anxiety • Consider psychiatry consult