

Dyspnea Part II Written Summary

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** Drug doses are a guide only, always check second source and follow local practice guidelines*

TAKE HOME POINTS

- ❑ A-B-Cs, if unstable follow ACLS protocols
- ❑ Dyspnea often indicates a life-threatening process and undifferentiated patients should be monitored closely as the workup proceeds
- ❑ Understand that with any of these diagnoses, a patient's clinical presentation can be widely variable, from stable to cardiac arrest.

INTRODUCTION:

In last month's C3, we brought you the eagle's-eye view of dyspnea, and we discussed the broad differential diagnosis of potential (albeit less common) causes of dyspnea. This month we are going to dive deep into the most common causes of dyspnea which reside in two major organ systems...the heart & the lungs.

90% of patients who present with "dyspnea" are going to have a cardiopulmonary cause and so today we are talking about the bread and butter, : pneumonias, congestive heart failure COPD exacerbations, pulmonary embolism, MI, asthma, cardiac tamponade. This is what the majority of patients are going to have.

Remember, we always have to consider two very different clinical approaches based on the patient's hemodynamic stability:

- The "stable" patient, whom you have time to obtain an history from versus
- The "extremis" patient, whom is crashing and requires immediate intervention

For the sake of today's discussion, we are going to consider the stable patient, who is sick, but not quite in extremis. We will have a few minutes to gather our thoughts and be able to consider our approach. Remember that in reality, patients can present, initially appearing stable, only to quickly decompensate in front of you. So it behooves you to have a sense of urgency with any patient who really presents with a chief complaint of shortness of breath or dyspnea.

It is also important to understand that patients may present with a combination of these diagnoses simultaneously, so a methodical approach is paramount, so that we don't miss anything.

CASE

A 60 year old female with a history of CHF and COPD is brought in by ambulance with chief complaint of dyspnea. She gets wheeled into the room, sitting upright, leaning forward and demonstrating some moderate work of breathing. SpO₂ = 88%. Practically speaking what should be your initial approach?

INITIAL APPROACH:

- **IV- O₂ - Monitor:** vital signs, advanced airway equipment at bedside

VITAL SIGNS

- Primacy of heart rate will initially dictate your management: If the heart rate is extremely high >140, or extremely low <40 this first off takes you down a different ACLS algorithm, where you suspect cardiac etiology and mandates immediate intervention.
- The blood pressure can also mandate immediate intervention. If you are facing hypotension, you not only need to ask yourself WHY are they hypotensive? But make efforts to improve it, and also be aware of medications (ie: nitroglycerin) which can make matters worse.

ABC's:

AIRWAY: We initially care about a few things right upfront

- Is the airway patent?
- Do I hear stridor? = initial evaluation for ruling out upper airway obstruction (e.g.: foreign body, epiglottitis, deep space infection etc.)

- Is the trachea midline? = initial evaluation for massive pneumothorax
- How does their voice sound? Hot potato, muffled etc.

While evaluating the airway, since you are near the neck, a good thing to do is to check for the JVP (jugular venous pulse) which can be a helpful tip off for PE or CHF. A physical exam finding that can help alert you to badness!

BREATHING: breath sounds are key! This really can help you hone in on cardiac versus pulmonary etiologies.

Some examples include:

- Wheezing/tight: Asthma, COPD, Anaphylaxis, Croup
- Wet: CHF/Pulmonary edema/ARDS/hemoptysis
- Rhonchi = PNA/deeper FB aspiration
- Absent = pneumothorax/hemothorax
- Normal lung sounds = PE, pericardial effusion, MI → unless fulminant failure ensues

CIRCULATION:

- How are they perfusing?
- Listening for heart sounds S3 / S4 can add to rule in, certain disease processes (ie: CHF).

INITIAL ORDERS:

- Oxygen- for anyone who is hypoxic and/or has increased work of breathing, certainly a little O2 doesn't hurt. A few caveats are for those patients with severe COPD, it is important not to give them excessive O2 and exacerbate their CO2 retention.

Of note, recent data suggests that routine O₂ for acute coronary syndrome may be more harmful than beneficial due to free radicals. So O₂ should not routinely be used, rather is best warranted when the patient is hypoxic and/or having dyspnea.

- CXR- low threshold, except for asthmatics
- EKG
- Bedside Ultrasound: helpful to evaluate for large pericardial effusion, cardiac squeeze
- Blood tests to consider: D-Dimer, Beta Natriuretic Peptide(BNP), troponin, lactate, blood culture, hemoglobin

Common Interventions to consider:

- Albuterol / atrovent: wheezing patients (before you confirm asthma/copd)
- ASA (can pretty much give to everyone unless allergic)
- Nitroglycerin (CHF/pulmonary edema, ACS if BP stable)
- BiPAP
- Fluids (ok for most, start small)
- +/- anchor antibiotics if suspecting Pneumonia/sepsis

DIFFERENTIAL DIAGNOSIS TO CONSIDER

CARDIAC ETIOLOGIES: The Big Ones!

- **CONGESTIVE HEART FAILURE (CHF)**: the pump is failing. Clinically these patients can have a wide spectrum of presentation: from being a little fluid overloaded with peripheral edema, all the way to fulminant pulmonary edema and respiratory failure. To simplify it, think “fluid overload”.
 - EXAM

- “WET” lungs→ their pump is weak (low ejection fraction) and there is cardiac output is poor, thus fluid gets backed up into the pulmonary system. Listen for the “cardiac wheeze” → rales wet lungs.
- Peripheral edema, +JVD + S3
- TRIGGERS
 - Need to also look for the exacerbator “something tipped them over the edge” What is it? Medication non-compliance? Myocardial ischemia? High sodium intake?
- WORKUP
 - CXR: look for kerly B lines, +cardiomegaly ,fluffy bilateral
 - Bedside Ultrasound: to look for “lung rockets”=fluid and perform echo
 - Blood tests: consider BNP (Brain Natriuretic Peptide)
 - ECG : mandatory to rule out ischemia
- MANAGEMENT is based on severity:
 - Medications to consider: nitroglycerin, +/- diuretics
*controversial for early upfront use
 - +/- BIPAP
 - +/- Intubation
- **ACUTE CORONARY SYNDROME (ACS):** ischemic heart disease, is one of the largest killers. Remember that women, elderly and immunosuppressed patients may present atypically (i.e.: not have any chest pain, or have only vague complaints such as fatigue, weakness, and shortness of breath).
 - EXAM
 - Normal lungs sounds (unless with concomitant heart failure). Clinical presentation is widely variable from mild vague complaints → fulminant cardiac arrest.
 - TRIGGERS

- Consider underlying risk factors (family history, smoker, Diabetes, HTN, hyperlipidemia etc).
- Consider special patient populations who present atypically: women, elderly, chronic illness, immunosuppressed.
- **WORKUP**
 - CXR: typically normal. Utility is to rule out other causes
 - Bedside Ultrasound: normal until large region affected
 - Blood tests: trop (beware renal pts)
 - ECG: STEMI, NSTEMI, other acute ST changes
- **MANAGEMENT**
 - Aspirin (If not allergic)
 - Nitroglycerin (if blood pressure can handle and MI is not right sided)
 - Heparin
 - Beta Blocker
 - +/- CATH LAB or TPA if STEMI
- **PERICARDIAL EFFUSION/CARDIAC TAMPONADE:** clinical presentation is variable these patients go from looking fairly stable, all the way to cardiac arrest. By the time they have a clinically significant pericardial effusion, these patients are typically sick appearing. Typically they will complain of dyspnea or chest discomfort.
 - **EXAM**
 - Muffled heart sounds
 - +/- Elevated JVP
 - **TRIGGERS**

- Consider high risk patient populations: Cancer patients, rheumatoid diseases, chronic inflammatory conditions, tuberculosis, recent heart surgery, or trauma etc.
- **WORKUP**
 - Bedside Ultrasound: can help differentiate between effusion vs. tamponade.
 - Blood tests: not useful, except to help rule in/out underlying causes
 - ECG: expect low voltages
 - CXR: water bottle heart if large effusion
- **MANAGEMENT**
 - Pericardiocentesis
 - Pericardial window

PULMONARY

- **ASTHMA/COPD:** patients can present with mild to severe exacerbations. Ask your patient if they have a have a prolonged history of asthma or COPD and how many hospitalizations and intubations they have ever had. This helps you gauge how sick they might get.
 - **EXAM**
 - Diffuse expiratory wheezes (DRY), accessory muscle use, tripodding and pursed lips.
 - **TRIGGERS**
 - Need to also look for the exacerbator “something tipped them over the edge” what is that trigger?
 - Common triggers include but aren’t limited to:
 - Asthma: med noncompliance, URI
 - COPD: above + pneumothorax, Pulmonary embolus, bleb, ACS, bronchitis/pneumonia

- **WORKUP**
 - CXR: Asthma (normal); COPD emphysema (bleb) +r/o pneumonia
 - Bedside ultrasound: Confirm lung slide in COPD patients to rule out pneumothorax
 - Labs: not helpful
 - ECG: important in COPD patients to rule out ischemia as a possible trigger
- **MANAGEMENT**
 - Albuterol/atrovent (x3 vs. continuous) for all patients
 - Steroids (iv or oral) should be considered in most patients
 - Magnesium, Terbutaline, Epinephrine should be considered if severe
 - BiPAP and defer intubation as long as possible
- **PNEUMONIA:** Patients who present to the ED with dyspnea due to an underlying pneumonia will usually be febrile, relatively ill appearing with a productive cough. Considering sepsis early on is vital in your management. Pay attention to their vitals and underlying co-morbidities.
 - **EXAM**
 - Productive cough (rhonchi, wet/junky cough)
 - Mild hypoxia
 - Increased work of breathing, accessory muscle use
 - Look for signs of sepsis
 - **TRIGGERS**
 - Ask for travel history, sick contacts, underlying medical problems

- Special patient populations: HIV (PCP pneumonia), DM2, Skilled Nursing Home patients/institutionalized patients, immunosuppressed patients
- **WORKUP**
 - CXR: variable, Lobar consolidation, ground glass appearance, interstitial appearance, diffuse infiltrates.
 - LABS: leukocytosis or leukopenia may be present, elevated lactate would increase suspicion for sepsis, obtaining blood cultures is important if febrile
 - ECG: expect sinus tachycardia, rule out other concerns
- **MANAGEMENT**
 - Early broad spectrum antibiotics
 - Antipyretics
 - IVF resuscitation
 - O2
- **PULMONARY EMBOLISM:** presentation is variable from mild tachypnea to cardiac arrest. shortness of breath, unexplainable tachycardia, hypoxia (can be subtle),
 - **EXAM**
 - Mild - moderate tachypnea, Mild - moderate hypoxia
 - Unexplained tachycardia
 - Possibly unilateral leg swelling
 - **TRIGGERS**
 - History of clotting disorder, oral contraceptive use, recent surgery/immobilization, recent travel, autoimmune diseases, cancer
 - **WORKUP**

- CXR: normal → elevated hemidiaphragm
- Bedside Ultrasound:
- Lab:D-dimer (be considerate can be a quagmire)
- ECG: s1q3t3, right heart strain
- **MANAGEMENT**
 - heparin versus thrombolytics depends on patient's instability
- **PNEUMOTHORAX:** once clinically significant patient will typically be rather tachypneic, with accessory muscle use. Patients may not have chest pain, but rather complain of dyspnea and may appear anxious.
 - **EXAM**
 - Decreased breath sounds (or no sounds) on unilateral side
 - If large (i.e.: Tension pneumothorax) trachea deviated, hypotensive
 - **WORKUP**
 - CXR +hopefully diagnostic
 - Bedside Ultrasound = no lung sliding
 - **MANAGEMENT**
 - Needle thoracostomy vs. PIGTAIL/Heimlich valve vs. Chest Tube
 - Oxygen
 - If you suspect concomitant hemothorax or abscess use larger tube
- **OTHER CONSIDERATIONS:** We've covered the most common cardiopulmonary diseases here, however clearly this is not comprehensive. There are many other cardio pulmonary etiologies of shortness of breath (pneumonitis from toxic exposures or from immunologic diseases like lupus; variable presentations of atypical and fungal pneumonias etc)... the list goes on and on.

When patients present with dyspnea, they often have a combination of multiple diseases and particularly in the elderly, it is prudent to keep an open mind as to what is taking them over the edge. At times when the diagnosis isn't initially obvious, you just have to resuscitate and support them for a bit while you work out what's going on. There is nothing wrong with that. Having a systematic approach is important and keeping an open mind will help you intervene appropriately.