بسم الله الرحمن الرحيم

تنگی نفس

دکتر غلامرضا فریداعلایی
دانشیار طب اورژانس
دانشگاه علوم پزشکی تبریز

تنگی نفس

گیرنده مرکزی تنفس در بصل النخاع (medulla oblongata) و گیرنده محیطی در نزدیک کاروتید بادی قرار دارد.

تعریف تنگی نفس

the sensation of breathlessness and the patient’s reaction to that sensation.

an uncomfortable awareness of breathing difficulties that in the extreme manifests as “air hunger.”

the feeling as shortness of breath, chest tightness, or difficulty breathing.

اصطلاحات مرتبط با تنگی نفس

Dyspnea on exertion: Dyspnea provoked by physical effort or exertion. It often is quantified in simple terms, such as the number of stairs or number of blocks a patient can manage before the onset of dyspnea.

Exertional dyspnea commonly is associated with COPD but also can be seen with poor cardiac reserve.

اصطلاحات مرتبط با تنگی نفس

Orthopnea: Dyspnea in a recumbent position. It usually is measured in number of pillows the patient uses to lie in bed (eg, two-pillow orthopnea).

Orthopnea can result from left-sided heart failure, COPD, or neuromuscular disorders.

اصطلاحات مرتبط با تنگی نفس

Paroxysmal nocturnal dyspnea: Sudden onset of dyspnea occurring while reclining at night, usually related to the presence of congestive heart failure

Paroxysmal nocturnal dyspnea is most common in patients with left-sided heart failure but also occurs in COPD.

اصطلاحات مرتبط با تنگی نفس

Tachypnea: A respiratory rate greater than normal.

Normal rates range from

44 cycles/min in a newborn

to 14 to 18 cycles/min in adults.

1-6 yr	7-12 yr	13-18 yr
24 ± 3	19 ± 2	17 ± 3

TABLE 1-2 Normal Respiratory Rates (Breaths/min) in Children Up to 3 Years of Age (Means ± SD)

AGE (mo)	AWAKE	ASLEEP
0-<2	48.0 ± 9.1	39.8 ± 8.7
2-<6	44.1 ± 9.9	33.4 ± 7.0
6-<12	39.1 ± 8.5	29.6 ± 7.0
12-<18	34.5 ± 5.8	27.2 ± 5.6
18-<24	32.0 ± 4.8	25.3 ± 4.6
24-<30	30.0 ± 6.2	23.1 ± 4.6
30-36	27.0 ± 4.1	21.5 ± 3.7

اصطلاحات مرتبط با تنگی نفس

Hyperpnea: Greater than normal minute ventilation to meet metabolic requirements.

=

Hyperventilation: A minute ventilation (determined by respiratory rate and tidal volume) that exceeds metabolic demand. (low partial pressure of carbon dioxide [Pco2] and elevated pH)

اصطلاحات مرتبط با تنگی نفس

hypoxemia (pulse oximetry reading <95% at sea level or <92% in Denver or Salt Lake City

تنگی نفس

Dyspnea results from a variety of conditions, ranging from non-urgent to life-threatening. Neither the clinical severity nor the patient’s perception correlates well with the seriousness of underlying pathology and may be affected by emotions, behavioral and cultural influences, and external stimuli.

Differential Diagnoses for Acute Dyspnea

ORGAN SYSTEM	CRITICAL DIAGNOSES	EMERGENT DIAGNOSES	NONEMERGENT DIAGNOSES
Pulmonary	Airway obstruction Pulmonary embolus Noncardiogenic edema Anaphylaxis Ventilatory failure	Spontaneous pneumothorax Asthma Cor pulmonale Aspiration Pneumonia (CAP score >70)	Pleural effusion Neoplasm Pneumonia (CAP score ≤70) COPD
Cardiac	Pulmonary edema Myocardial infarction Cardiac tamponade	Pericarditis	Congenital heart disease Valvular heart disease Cardiomyopathy
PRIMARILY ASSOCIATED WITH NORMAL OR INCREASED RESPIRATORY EFFORT			
Abdominal		Mechanical interference Hypotension, sepsis from ruptured viscus, bowel obstruction, inflammatory or infectious process	Pregnancy Ascites obesity
Psychogenic			Hyperventilation syndrome Somatization disorder Panic attack
Metabolic or endocrine	Toxic ingestion DKA	Renal failure Electrolyte abnormalities Metabolic acidosis	Fever Thyroid disease
Infectious	Epiglottitis	Pneumonia (CAP score >70)	Pneumonia (CAP score <70)
Traumatic	Tension pneumothorax Cardiac tamponade Flail chest	Simple pneumothorax, hemothorax Diaphragmatic rupture Neurologic injury	Rib fractures
Hematologic	Carbon monoxide or cyanide poisoning Acute chest syndrome	Anemia	
PRIMARILY ASSOCIATED WITH DECREASED RESPIRATORY EFFORT			
Neuromuscular	CVA, intracranial insult Organophosphate poisoning	Multiple sclerosis Guillain-Barré syndrome Tick paralysis	ALS Polymyositis Porphyria

ALS, Amyotrophic lateral sclerosis; *CAP*, community-acquired pneumonia; *COPD*, chronic obstructive pulmonary disease; *CVA*, cerebrovascular accident; *DKA*, diabetic ketoacidosis.

تنگی نفس

Duration of Dyspnea.

Chronic or progressive dyspnea usually denotes primary cardiac or pulmonary disease.

Acute dyspneic spells may result from asthma exacerbation; infection; pulmonary embolus; intermittent cardiac dysfunction; psychogenic causes; or inhalation of irritants, allergens, or foreign body

تنگی نفس

Onset of Dyspnea.

Sudden onset of dyspnea should lead to consideration of pulmonary embolism (PE) or spontaneous pneumothorax.

Dyspnea that builds slowly over hours or days may represent a flare of asthma or COPD; pneumonia; recurrent, small pulmonary emboli; congestive heart failure; or malignancy

تنگی نفس

PE or myocardial infarction may cause isolated dyspnea with or without associated chest pain, particularly if the pain is constant, dull, or visceral.

Pivotal Findings in Physical Examination

SIGN	PHYSICAL FINDING	DIAGNOSES TO CONSIDER
Vital signs	Tachypnea	Pneumonia, pneumothorax
	Hypopnea	Intracranial insult, drug or toxin ingestion
	Tachycardia	PE, traumatic chest injury
	Hypotension	Tension pneumothorax
	Fever	Pneumonia, PE
General appearance	Cachexia, weight loss	Malignancy, acquired immune disorder, mycobacterial infection
	Obesity	Hypoventilation, sleep apnea, PE
	Pregnancy	PE
	Barrel chest	COPD
	"Sniffing" position	Epiglottitis
	"Tripoding" position	COPD or asthma with severe distress
	Traumatic injury	Pneumothorax (simple, tension), rib fractures, diaphragmatic injury, flail chest, hemothorax, pulmonary contusion
Skin and nails	Tobacco stains or odor	COPD, malignancy, infection
	Clubbing	Chronic hypoxia, intracardiac shunts, or pulmonary vascular anomalies
	Pallid skin or conjunctivae	Anemia
	Muscle wasting	Neuromuscular disease
	Bruising	Chest wall: Rib fractures, pneumothorax
	Diffuse: Thrombocytopenia, chronic steroid use, anticoagulation	
	Subcutaneous emphysema	Rib fractures, pneumothorax, tracheobronchial disruption
	Hives, rash	Allergic reaction, infection, tick-borne illness
Neck	Stridor	Upper airway edema or infection, foreign body, traumatic injury, anaphylaxis
	JVD	Tension pneumothorax, COPD or asthma exacerbation, fluid overload or CHF, PE, cardiac tamponade

Lung examination	Wheezes	CHF, anaphylaxis
	Bronchospasm	
	Rales	CHF, pneumonia, PE
	Unilateral decrease	Pneumothorax, pleural effusion, consolidation, rib fractures or contusion, pulmonary contusion
	Hemoptysis	Malignancy, infection, bleeding disorder, CHF
	Sputum production	Infection (viral, bacterial)
	Friction rub	Pleurisy
	Abnormal respiratory pattern (eg, Cheyne-Stokes)	Intracranial insult
Chest examination	Crepitance or pain on palpation	Rib or sternal fractures
	Subcutaneous emphysema	Pneumothorax, tracheobronchial rupture
	Thoracoabdominal desynchrony	Diaphragmatic injury with herniation; cervical spinal cord trauma
	Flail segment	Flail chest, pulmonary contusion
Cardiac examination	Murmur	PE
	S_3 or S_4 gallop	PE
	S_2 accentuation	PE
	Muffled heart sounds	Cardiac tamponade, pericardial effusion
Extremities	Calf tenderness, Homans' sign	PE
	Edema	CHF
Neurologic examination	Focal deficits (motor, sensory, cognitive)	Stroke, intracranial hemorrhage causing central abnormal respiratory drive; if long-standing, risk of aspiration pneumonia
	Symmetrical deficits	Neuromuscular disease
	Diffuse weakness	Metabolic or electrolyte abnormality (hypocalcemia, hypomagnesemia, hypophosphatemia), anemia
	Hyporeflexia	Hypermagnesemia
	Ascending weakness	Guillain-Barré syndrome

پاراکلینیک در تنگی نفس

VBG & Puls oximetry OR ABG

ECG

End-tidal carbon dioxide (ETco2)

thoracic ultrasound

CBC-K- P-Ca-Mg- cardiac markers and D-dimer-BNP-BS-Urea-Cr

CT angiography- ultrasonography- CXR-Echo

تنگی نفس

ABG OR VBG

سرنگ هپارینه شود.

هپارین داخل لوله نماند

در اخذ نمونه حداقل ۱ سی سی خون تهیه شود (هر چند با ۰/۲ سی سی قابل انجام هست) (هپارین مختصر هم باعث خطا می شود).

تنگی نفس

خانم ۳۶ ساله با تنگی نفس ناگهانی توسط EMS آورده شده است. درد سینه همزمان را بیان می کند که با تنفس کشیدن بدتر می شود. سرفه با خلط دارد که بدلیل سرفه زیاد حاوی رگه های خون می باشد.

BP=117/72 PR=128 RR=23 SPO2=94%

سوالات بیشتر؟

تشخیص های افتراقی؟

اقدامات تشخیصی؟

اقدامات درمانی

Diagnostic Table: Patterns of Diseases Often Resulting in Dyspnea

DISEASE	HISTORY (DYSPNEA)	ASSOCIATED SYMPTOMS	SIGNS AND PHYSICAL FINDINGS	TESTS
Pulmonary embolism	HPI: Abrupt onset, pleuritic pain, immobility (travel, recent surgery) PMH: Malignancy, DVT, PE, hypercoagulability, oral contraception, obesity	Diaphoresis, exertional dyspnea	Tachycardia, tachypnea, low-grade fever	Pulse oximetry, ABG (A-a gradient), D-dimer ECG (dysrhythmia, right-sided heart strain) CXR (Westermark sign, Hampton's hump), spiral CT, MRV Pulmonary angiogram Ultrasound positive for DVT

PTE

For many patients, the dyspnea is only present with exertion, and patients often need to be prompted to endorse this symptom.

Patients usually describe chest pain with PE in vague terms, unless they have pulmonary infarction. About 20% of ED patients with PE have focal pleuritic chest pain, but many say nonspecifically that their chest hurts with breathing, usually on the lateral aspects.

PTE

Evaluation for PE begins with an assessment of PTP and patients without symptoms or signs of PE (eg, no chest pain, no shortness of breath, no dyspnea on exertion, normal vital signs, and no recent syncope) should not be tested, even in the presence of risk factors.

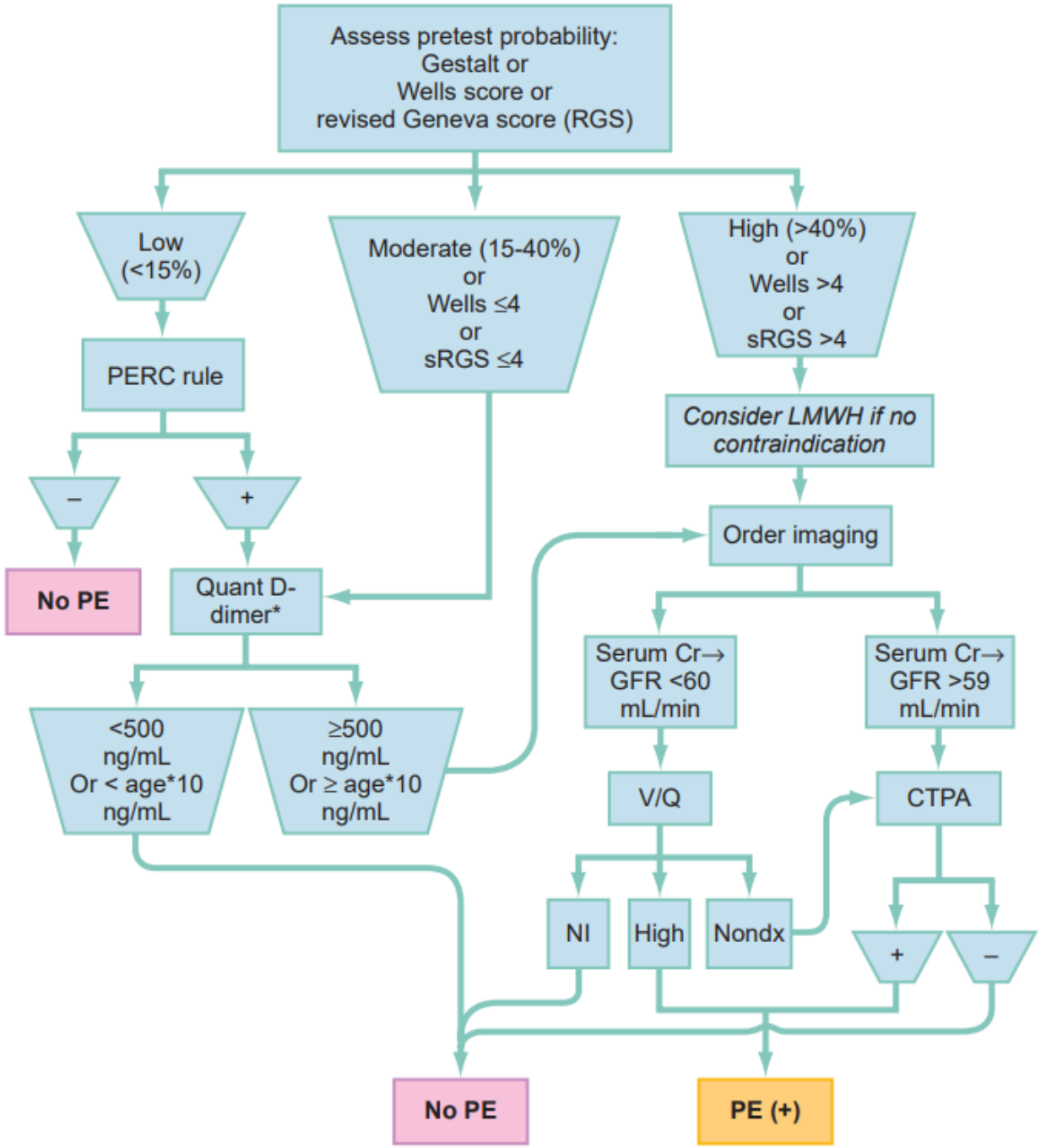
BOX 78.2

Pulmonary Embolism Rule-Out Criteria (PERC Rule)

Low pretest probability for PE by the treating emergency clinician's unstructured estimate, plus all the following must be true:

- Age < 50 yr
- Pulse rate < 100 beats/min
- Oxygen saturation < 94%
- No hemoptysis
- No unilateral leg swelling
- No recent major surgery or trauma
- No prior pulmonary embolism or deep venous thrombosis
- No hormone use

Findings	Points
Clinical signs of DVT	3.0
No alternate diagnosis likely or more likely than PTE	3.0
Heart rate >100 bpm	1.5
Immobilization in the previous 3 days or surgery in the previous 4 weeks	1.5
Previous diagnosis of DVT/PTE	1.5
Hemoptysis	1.0
Cancer	1.0



PTE

Patients with a non–high PTP (simplified revised Geneva score <5, Wells score < 5, or gestalt PTP < 40%) can have PE excluded with a normal D-dimer concentration, using the cutoff for abnormal established by the local laboratorian.

PTE

Approximately half of all patients with PE have no evidence of hypoxemia. a normal oxygen saturation, although reassuring, cannot rule out PE.

the presence of hypoxemia (pulse oximetry <95%, breathing room air) that cannot be explained by a known disease process increases the probability of PE.

When PE is diagnosed, the severity of hypoxemia represents a significant independent predictor of patient outcome.

PTE

Heparin OR fondaparinux, argatroban, apixaban, or rivaroxaban.

Fibrinolytic (Thrombolytic) Therapy

Surgical Embolectomy

BOX 78.1

Modified Hestia Criteria to Select Patients With Deep Vein Thrombosis and/or Pulmonary Embolism for Outpatient Treatment

Identifies low-risk PE if:

- Systolic blood pressure > 100 mm Hg
- No thrombolysis needed
- No active bleeding
- Oxygen required to maintain oxygen saturation > 94%
- Not already anticoagulated
- Absence of severe pain requiring > two doses of intravenous narcotics
- Other medical or social reasons to admit
- Creatinine clearance > 30mL/min
- Not pregnant, severe liver disease, or heparin-induced thrombocytopenia

تنگی نفس

آقای ۴۳ ساله با تنگی نفس توسط EMS آورده شده است. بنا به اظهار نظر EMS بیمار را از داخل ماشین که واژگون شده بود خارج کرده و به این مرکز انتقال داده اند.

BP=97/72 PR=138 RR=23 SPO2=93%

سوال ؟

تشخیص های افتراقی؟

اقدامات تشخیصی؟

اقدامات درمانی؟

Pneumothorax	Abrupt onset: Trauma, chest pain, thin males more likely to have spontaneous pneumothorax	Localized chest pain	Decreased breath sounds, subcutaneous emphysema, chest wall wounds or instability	CXR: Pneumothorax, rib fractures, hemothorax Ultrasound: Pneumothorax, pleural effusion
Simple				Ultrasound positive for pneumothorax
Tension	Decompensation of simple pneumothorax	Diaphoresis	JVD, tracheal deviation, muffled heart sounds, cardiovascular collapse	Clinical diagnosis: Requires immediate decompression. May verify via bedside ultrasound

تنگی نفس

آقای ۳۹ ساله با تنگی نفس توسط EMS آورده شده است. بیمار با هر کلمه یک نفس کوتاه می کشد و تعریق دارد. ناامیدانه از جیب خود یک اسپری آبی دراورده و به دهان خود اسپری می کند.

BP=147/75 PR=124 RR=32 SPO2=94%

سوال ؟

تشخیص های افتراقی؟

اقدامات تشخیصی؟

اقدامات درمانی؟

COPD or asthma	Tobacco use, medication noncompliance, URI symptoms, sudden weather change PMH: Environmental allergies FH: Asthma	Air hunger, diaphoresis	Retractions, accessory muscle use, tripoding, cyanosis "Shark fin" capnograph	CXR: Rule out infiltrate, pneumothorax, atelectasis (mucus plug) Ultrasound: Distinguish from heart failure Waveform capnography

آسم

در صورت وجود پالس اکسی متری نیاز به ABG نیست و VBG کافی هست. و در صورت وجود کاپنوگراف نیاز به ABG & VBG نیست.

گرافی لازم نیست مگر شک به عوارض مثل پنومونی, پنوموتوراکس و پنوومدیاستن باشد

آسم

Occasionally, despite improvement in PFT values with bronchodilator therapy, some patients have a transient fall in the partial pressure of oxygen in arterial blood (Pao2) secondary to pulmonary vasodilatation and worsening ventilation-perfusion mismatch.

TABLE 63.1

Objective Findings in Asthma Assessment

FACTOR	SEVERE ASTHMA (FEV_1)
Pulse rate (beats/min)	≥120 but may be less with equally severe asthma
Respiratory rate (breaths/min)	≥40 but most are >20, therefore non-discriminating
Pulsus paradoxus (mm Hg)	≥10 but may be absent with equally severe asthma in 50% of cases
Pulse rate ≥120, respiratory rate ≥20, pulsus paradoxus ≥10	If all three abnormal, 90% with severe asthma, but only 40% with FEV_1 <1.0 L have all three abnormal
Use of accessory muscles of respiration	If present, may indicate severe asthma; if absent, may have equally severe asthma in 50% of cases
ABG analysis (mm Hg)	Pao_2 ≤60 or $Paco_2$ ≥42 indicates severe asthma; all other values difficult to interpret unless PEFR or FEV_1 known
Pulmonary function studies	PEFR and FEV_1 measure directly the degree of airflow obstruction; most useful in assessing severity and guiding treatment decisions

ABG, Arterial blood gas; *FEV_1*, forced expiratory volume in 1 second; *$Paco_2$*, partial pressure of carbon dioxide in arterial blood; *Pao_2*, partial pressure of oxygen in arterial blood; *PEFR*, peak expiratory flow rate.

آسم

اکسیژن: spo2 را به بالای ۹۰ درصد برسانیم کافی هست. اما در خانم های حامله بالای ۹۵ برسانیم.

لازم نیست اکسیژن مرطوب بدهیم.

TABLE 63.2

Initial Severity Assessments and Therapies in the Emergency Department

	MILD TO MODERATE	SEVERE
FEV_1 or PEFR (percentage predicted/personal best)	≥40%	Unable or <40%
Oxygen therapy	Maintain Sao_2 ≥90%	Maintain Sao_2 ≥90%
NEBULIZED ALBUTEROL SOLUTION		
Levalbuterol (optimal)	1.25 mg every 20 minutes for up to three doses	1.25 mg every 20 min for three doses Continuous for 1 hour if severe
Racemic albuterol	2.5 mg every 20 minutes for up to three doses	5.0 mg every 20 minutes for three doses Continuous for 1 hour if severe
ALBUTEROL METERED-DOSE INHALER WITH VALVED HOLDING CHAMBER		
Levalbuterol (45 μg/puff) (optimal)	6 to 12 puffs every 20 minutes for up to three doses with supervision	Same for three doses (if able to do) with supervision
Racemic albuterol (90 μg/puff)	6 to 12 puffs every 20 minutes for up to three doses with supervision	Same for three doses (if able to do) with supervision
IPRATROPIUM THERAPY		
Nebulized solution	If previous response (same dose as for severe)	0.5 mg every 20 minutes for three doses (may mix with albuterol solution)
MDI (18 μg/puff) with VHC	If previous response (same dose as for severe)	8 puffs every 20 minutes for three doses
SYSTEMIC CORTICOSTEROIDS		
Oral (preferred)	40 to 80 mg of prednisone or prednisolone per day if no immediate response to albuterol	40 to 80 mg of prednisone or prednisolone per day
IV (unable to take orally or absorb)	40 to 80 mg of methylprednisolone per day	40 to 80 mg of methylprednisolone per day
IV magnesium sulfate	Not indicated	2 to 3 g over 20 minutes (or at rates of up to 1 g/min) if FEV_1 ≤25% predicted

FEV_1, Forced expiratory volume in 1 second; *IV*, intravenous; *MDI*, metered-dose inhaler; *PEFR*, peak expiratory flow rate; *Sao_2*, oxygen saturation in arterial blood: *VHC*, valved holding chamber.

تنگی نفس

آقای ۴۱ ساله با تنگی نفس توسط EMS آورده شده است. بیمار با هر کلمه یک نفس کوتاه می کشد و تعریق دارد.

BP=147/75 PR=124 RR=32 SPO2=93%

سوال ؟

تشخیص های افتراقی؟

اقدامات تشخیصی؟

اقدامات درمانی؟

Fluid overload	Gradual onset, dietary indiscretion or medication noncompliance, chest pain PMH: Recent MI, diabetes, CHF	Worsening orthopnea, PND	JVD, peripheral edema, S_3 or S_4 gallop, new cardiac dysrhythmia, hepatojugular reflux	CXR and/or ultrasound: Pleural effusion, interstitial edema, Kerley B lines, cardiomegaly ECG: Ischemia, dysrhythmia BNP

ادم ریه

قلبی

غیرقلبی

سایر علل تنگی نفس کرتیکال

آنافیلاکسی

انسداد راه هوایی با جسم خارجی

انفارکتوس میوکارد و سندرم کرونری حاد

دیس ریتمی

سایر علل تنگی نفس اورژانس

پنوموتوراکس خودبخودی

آسم

گیلن باره

مولتیپل اسکلروز

میاستنی گراو

سایر علل تنگی نفس

پنومونی

بدخیمی

پلورال افیوژن (حداقل ۵۰۰ سی سی باشد)

ARDS

فیبروز ریه

سل

برونشیت و برونشکتازی

سایر علل تنگی نفس

علل قلبی:

تامپوناد قلبی, پریکاردیال افیوژن با یا بدون تامپوناد

پریکاردیت, و میوکاردیت و کاردیومیوپاتی

اندوکاردیت و تب روماتیسمی

بیماری دریچه ای

پنومومدیاستن

اختلال عملکرد پیس میکر

نارسایی قلب

هیپرتنشن

سایر علل تنگی نفس

انسداد راه هوایی فوقانی:

اپیگلوتیت, آنژین لودویگ, آبسه رتروفارنژیال

اقدامات تنگی نفس

به محض رسیدن:

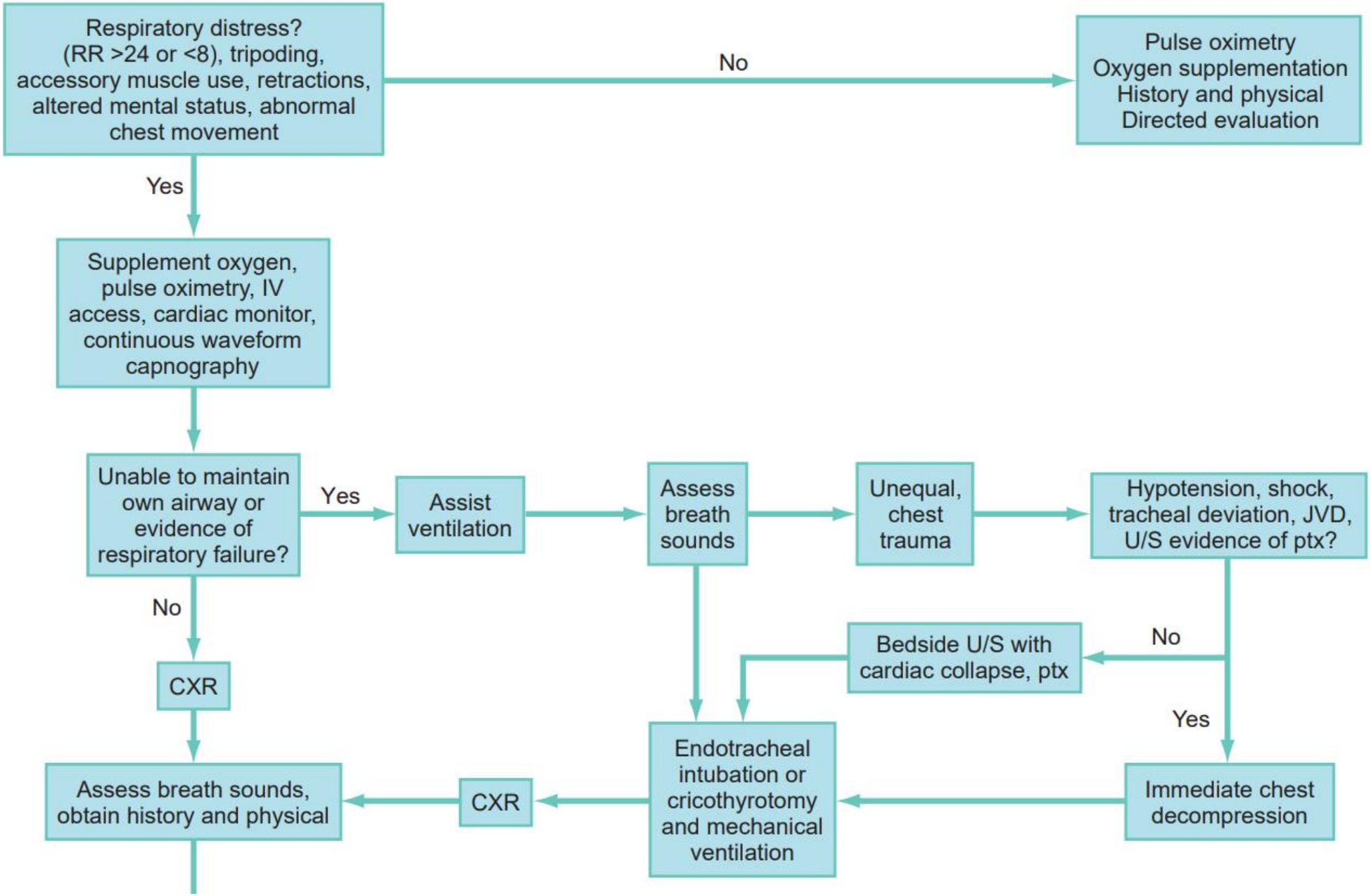
پالس اکسیمتری

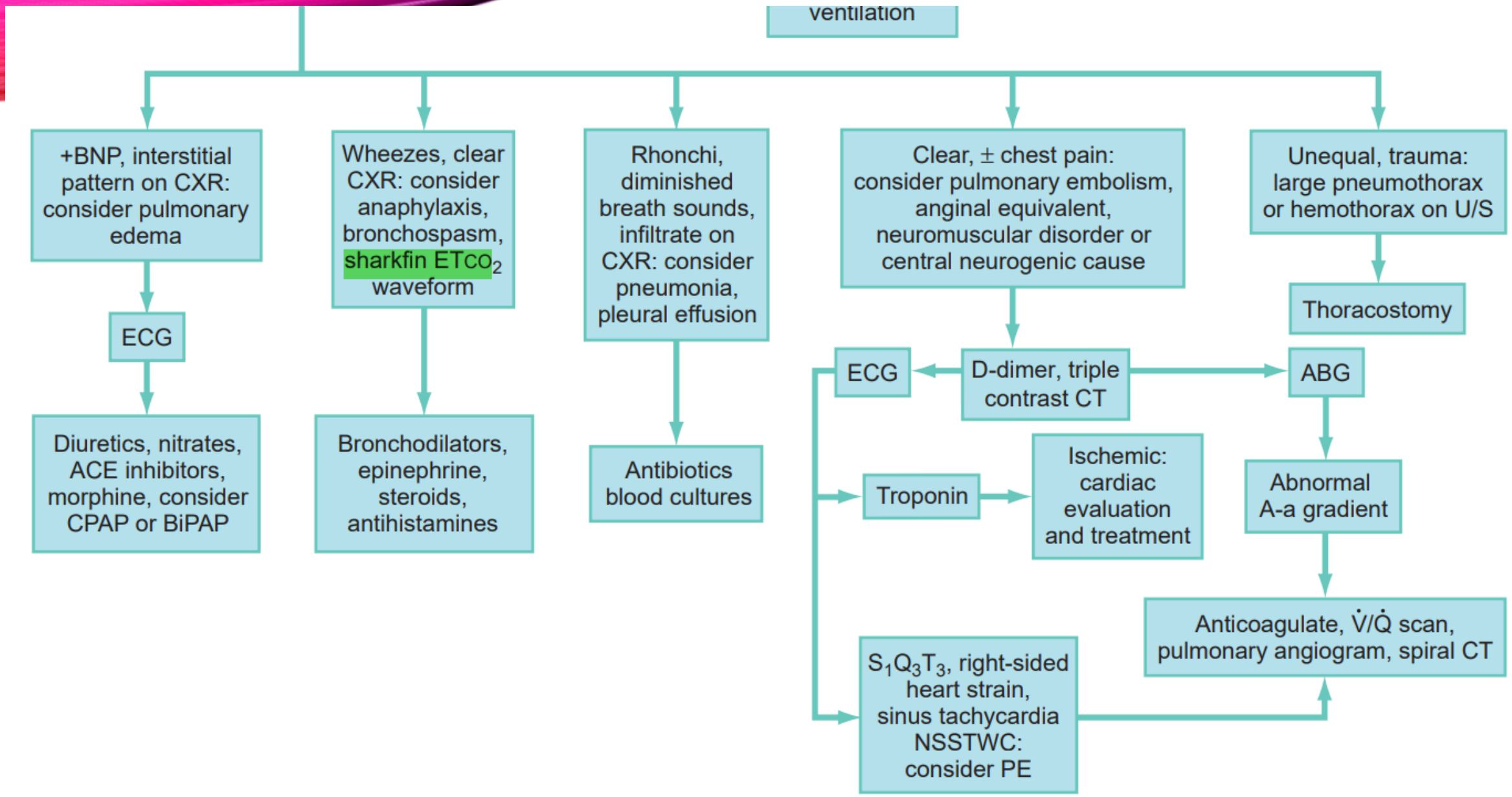
مونیتور قلبی

اکسیژن در صورت (spo2< 94 (در نکات کلیدی زیر ۹۵)

IV Line

capnography Waveform


Respiratory distress? (RR >24 or <8), tripoding, accessory muscle use, retractions, altered mental status, abnormal chest movement
No
Pulse oximetry
Oxygen supplementation
History and physical
Directed evaluation
Yes
Supplement oxygen, pulse oximetry, IV access, cardiac monitor, continuous waveform capnography
Unable to maintain own airway or evidence of respiratory failure?
Yes
Assist ventilation
Assess breath sounds
Unequal, chest trauma
Hypotension, shock, tracheal deviation, JVD, U/S evidence of ptx?
No
CXR
Bedside U/S with cardiac collapse, ptx
No
Yes
Assess breath sounds, obtain history and physical
CXR
Endotracheal intubation or cricothyrotomy and mechanical ventilation
Immediate chest decompression


ventilation
+BNP, interstitial pattern on CXR: consider pulmonary edema
ECG
Diuretics, nitrates, ACE inhibitors, morphine, consider CPAP or BiPAP
Wheezes, clear CXR: consider anaphylaxis, bronchospasm, sharkfin $ETCO_2$ waveform
Bronchodilators, epinephrine, steroids, antihistamines
Rhonchi, diminished breath sounds, infiltrate on CXR: consider pneumonia, pleural effusion
Antibiotics blood cultures
Clear, ± chest pain: consider pulmonary embolism, anginal equivalent, neuromuscular disorder or central neurogenic cause
ECG
D-dimer, triple contrast CT
Troponin
Ischemic: cardiac evaluation and treatment
$S_1Q_3T_3$, right-sided heart strain, sinus tachycardia NSSTWC: consider PE
Unequal, trauma: large pneumothorax or hemothorax on U/S
Thoracostomy
ABG
Abnormal A-a gradient
Anticoagulate, $\dot{V}/\dot{Q}$ scan, pulmonary angiogram, spiral CT

اقدامات تنگی نفس

In patients with somnolence or obtundation, hypercarbia and respiratory failure should be considered as possible etiologies. If necessary, ventilation should be assisted manually or mechanically, either noninvasively for the short term, or with the patient tracheally intubated for airway protection for prolonged ventilation

اقدامات تنگی نفس

بیمار کریتیکال یا unstable بعد از اقدامات اولیه و پایدار کردن بستری ICU شود.