DYSPNEA

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OUTLINE

- GENERAL RULES (REPEAT)
- CASE REPORTS
- DEFINITION
- PATHOPHYSIOLOGY
- ETIOLOGY
- DIFFERENTIAL DIAGNOSIS
- MANAGEMENT/SPECIAL POPULATION(S)

Case report 48 y. woman - history

- **Brought by ambulance to emergency center because of sudden onset of dyspnea.**
- **Standing in the kitchen making dinner, when she suddenly felt as if she could not get enough air, her heart started racing and she became light-headed and felt as if she would faint, but did not.**
- **Denied chest pain and/or cough. Her history is significant only for gallstones (cholecystectomy 2 weeks previously, complicated by wound infection so she stayed in the hospital for 8 days).**
- **No drugs regularly – acetaminopen (paracetamol) for pain.**

Case report 48 y. woman – physical examination, tests …

- **Vital signs:**
- **118/89 mm Hg, HR-124/min, RR-28/min, temperature – 37.2 C, SaO2-96%**
- **Ucomfortable, diaphoretic, frightened. Oral mucosa slightly cyanotic, jugular pressure elevated, chest clear to auscultation. Right leg moderately swollen.**
- **Lab – troponin normal**
- **ECG – only tachycardia, no specific changes**
- **Diagnosis**
- **Next step(s)**

Case report 48 y. woman – physical examination, tests …

- D-Dimers
- Echocardiography
- CT
- Treatment ?

Case report 58 y. man - history

- **Experienced mild dyspnea on exertion for several years, recently worsening *sob* with minimal exercise and sometimes it starts at rest. Does not tolerate recumbent position - spends the night sitting up in a chair trying to sleep.**
- **Reports a cough with production of yellowish-brown sputum every morning throughout the year. No chest pain, fever, chills or lower extremities edema.**
- **Smokes 20-40 cig/day since age 15. Does not drink alcohol.**
- **No other diseases, no drugs regularly.**

Case report 58 y. man – physical examination, tests …

- **Vital signs: BP 135/85 mm Hg, HR-96/min, RR-26/min, temperature 36,4 C, SaO2-90 %.**
- **Sitting in the chair, leaning forward, arms braced to his knees. Ucomfortable with labored respirations and cyanotic lips. Using accessory muscles of respiration, and chest**
- **Neck veins not distended.**
- **Examination reveals wheezes and rhonchi bilaterally, no crackles. Anterio-posterior diameter of the chest increased inward movement of the lower rib cage with inspiration.**
- **Cardiac examination silent/still heart sounds.**
- **LE – no edema, …**

GENERAL RULES DYSPNEA:

- Definition
- Importance/prevalence/incidence
- Pathophysiology
- **Strategy of examination – diff. dg.**
- Management

DEFINITION (SYMPTOM):

- **Abnormally Uncomfortable Awareness of breathing (Harrison)**

- Subjective feeling, perception most frequently described as shortness of breath, inability to take a deep breath, or chest tightness.

- **It is always a sensation expressed by the patient and should not be confused with:**
- **rapid breathing (tachypnea),**
- **excessive breathing (hyperpnea)**
- **or hyperventilation.**

???

- **Trepopnea – lateral decubitus position**
- **Platypnea- upright position**
- **Sleep apnea - cause of hypertension, …**
- **Odine´s Curse (central hypoventilation syndrome)**

IMPORTANCE

- **Could indicate serious and life threatening disease**
- **Source of debilitating discomfort to the patient**
- **Burden to healthcare**

MAIN AIM:

- **TO ESTABLISH DIAGNOSIS/EXCLUDE SERIOUS (TREATABLE/MANAGEABLE) UNDERLYING DISEASE ASAP**
- **TREAT AND MANAGE DYSCOMFORT**

PATHOPHYSIOLOGY OF DYSPNEA ?

Mechanism(s):

- **Abnormal activation of the respiratory centres in the brainstem**

Intrathoracic rcp

Afferent som. nerves – muscles, chest wall, joints …

Afferent fibres in phrenic nerves

Chemorcp in the brain, aorta, carotids, …

Higher cortical centres

DIFFERENTIAL DIAGNOSIS

Cardiovascular causes

a) Congestive heart failure
b) Pulmonary embolism/pulmonary hypertension

Pulmonary causes

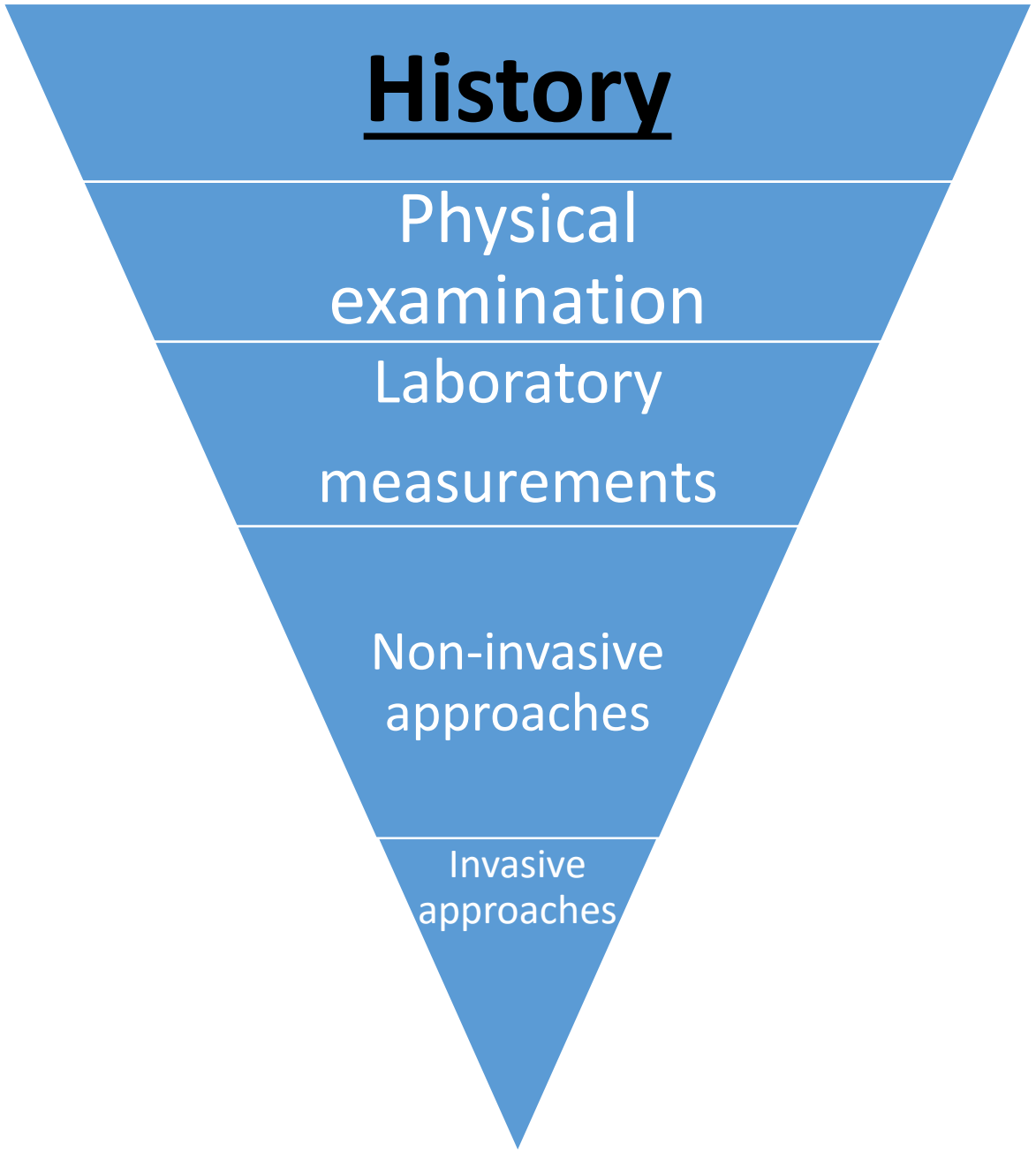
a) Pneumonia
b) Bronchospasm (asthma, COPD)

Miscellaneous causes

a) Upper airway obstruction
b) Anxiety
c) Pneumothorax
d) Massive pleural effusion
e) Diffuse parenchymal lung disease
f) Disease of the chest wall - kyphoscoliosis, of respiratory muscles –myasthenia gravis, ALS, …
g) Massive ascites
h) Postoperative atelectasis
i) Cardiac tamponade
j) Decreased left ventricular compliance
k) Mitral stenosis
l) Aspiration of gastric conent
m) Anemia

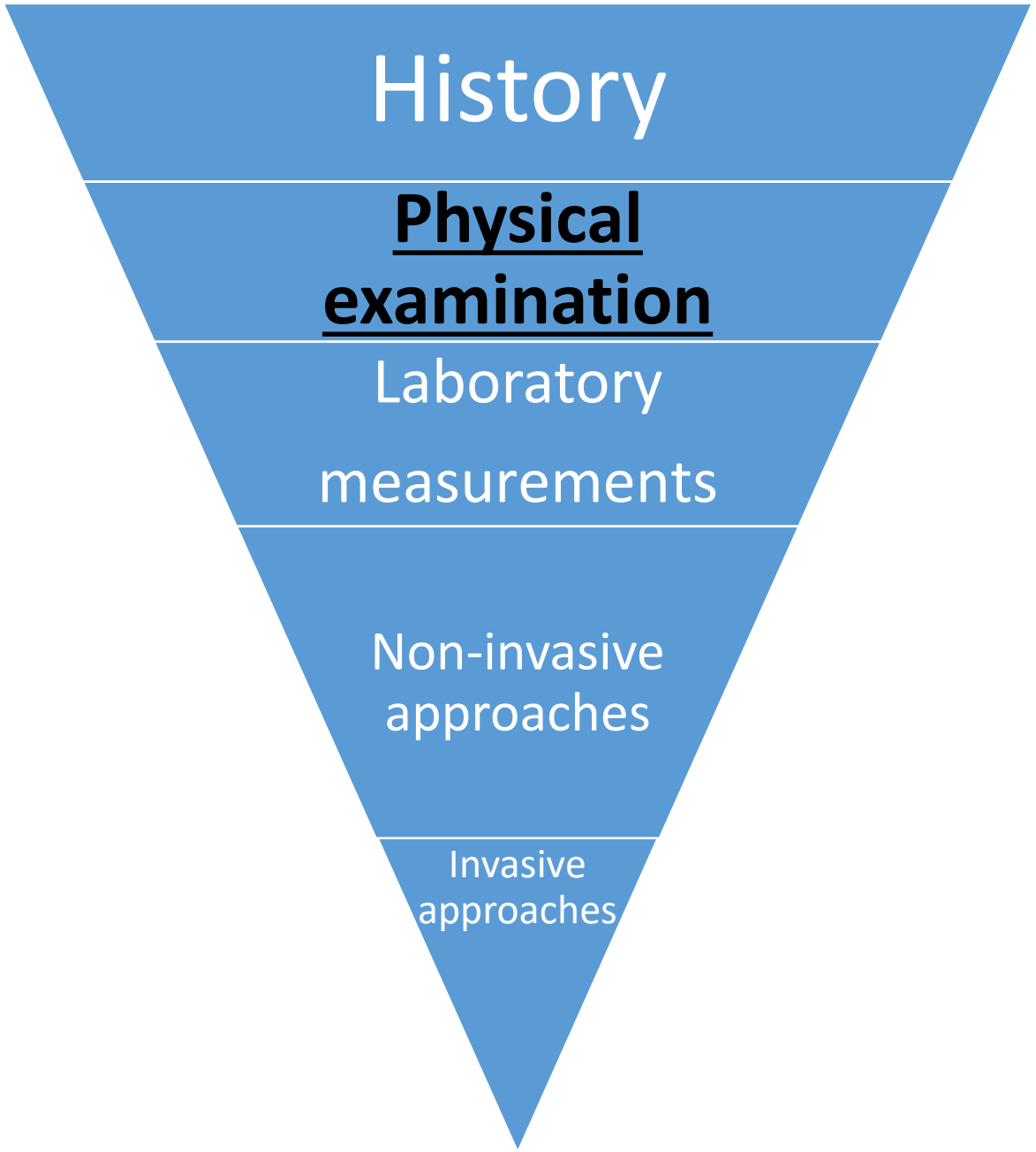
DISCRIMINATING FEATURES IN THE HISTORY AND PHYSICAL EXAMINATION OF A PATIENT WITH SHORTNESS OF BREATH

	CONGESTIVE HEART FAILURE	PULMONARY EMBOLISM AND INFARCTION	PNEUMONIA	ASTHMA/COPD
HISTORY				
Onset	Gradual	Sudden	Gradual	Gradual
Other	Orthopnea, night dyspnea, nycturia	Risk Factors of TE …	Cough, Fever, Sputum production	Previous history …
PHYSICAL EXAMINATION				
Temperature	Normal	Normal or slightly elevated	High	Normal
JVP	Elevated	Elevated or normal	Normal	Normal
Respiratory				
Crackles	Bibasal	Unilateral	Unilateral	No
Wheezes	±	±	±	Present
Friction rub	No	±	±	No

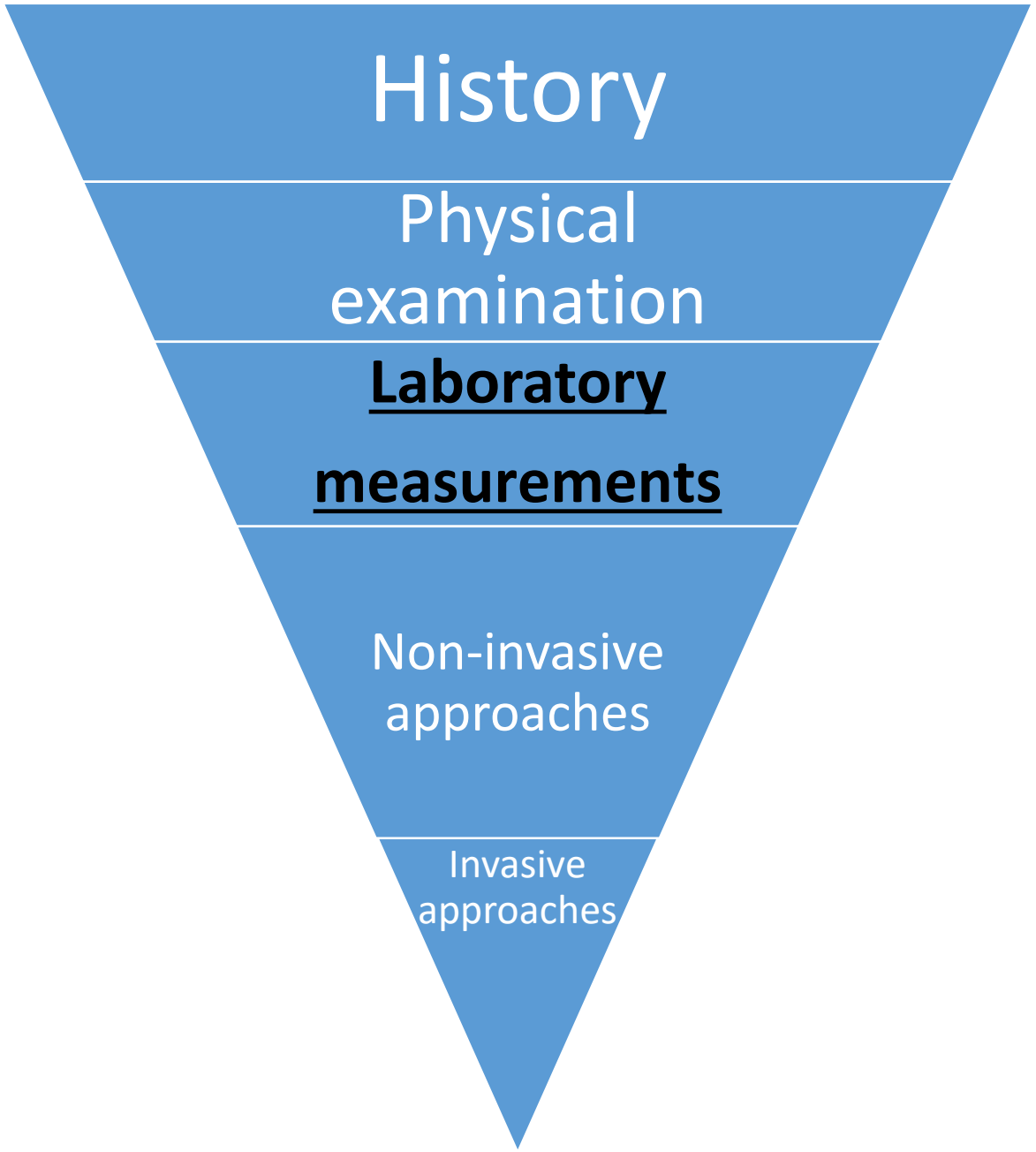


DYSPNEA:

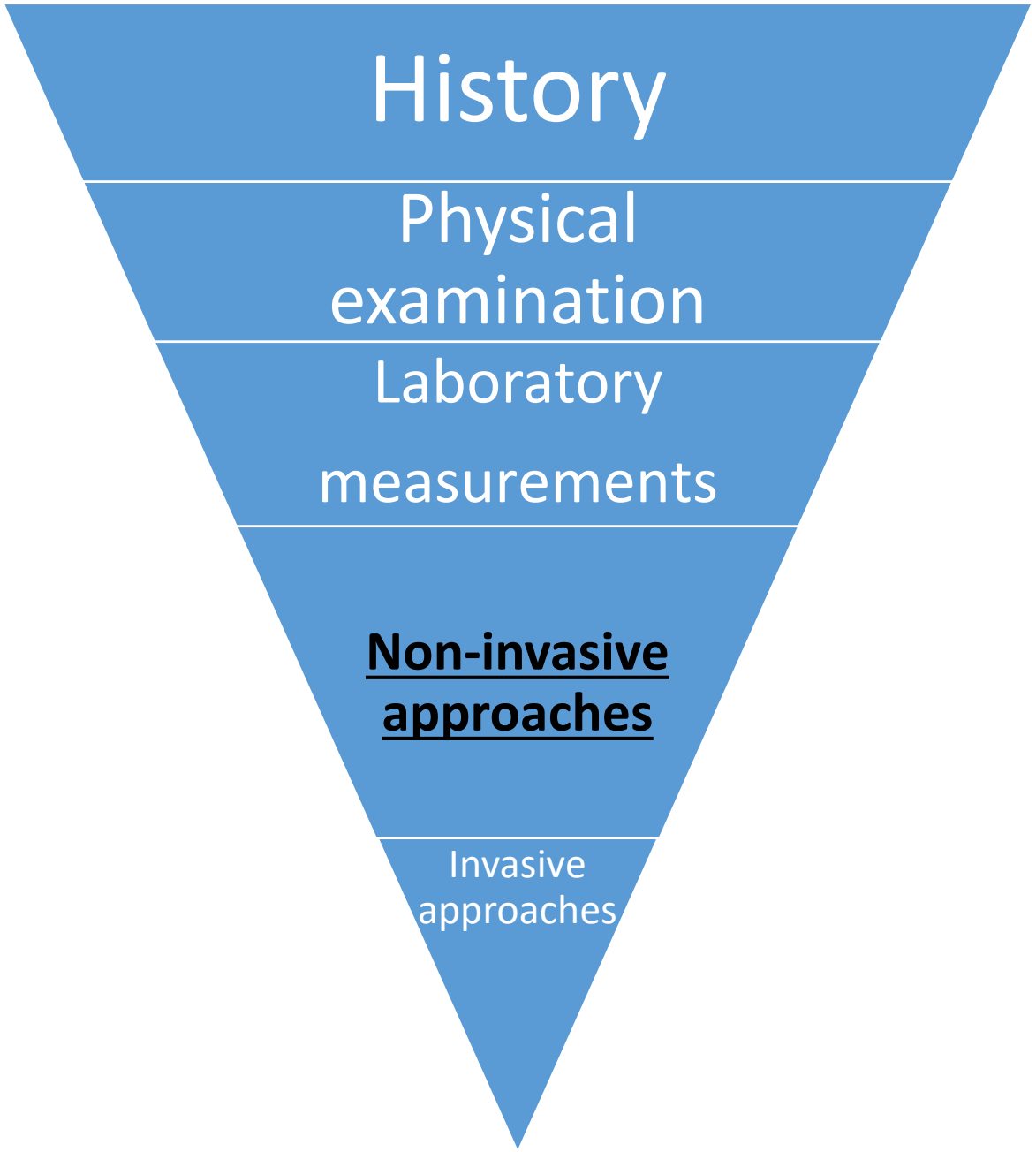
1. **Inspiratory x expiratory**
2. **Provoking/alleviating situations/maneuvres**
3. **Accompanying signs/risk factors, …**
4. **Intensity**
5. **Time course/duration – new, long-lasting, worsening**



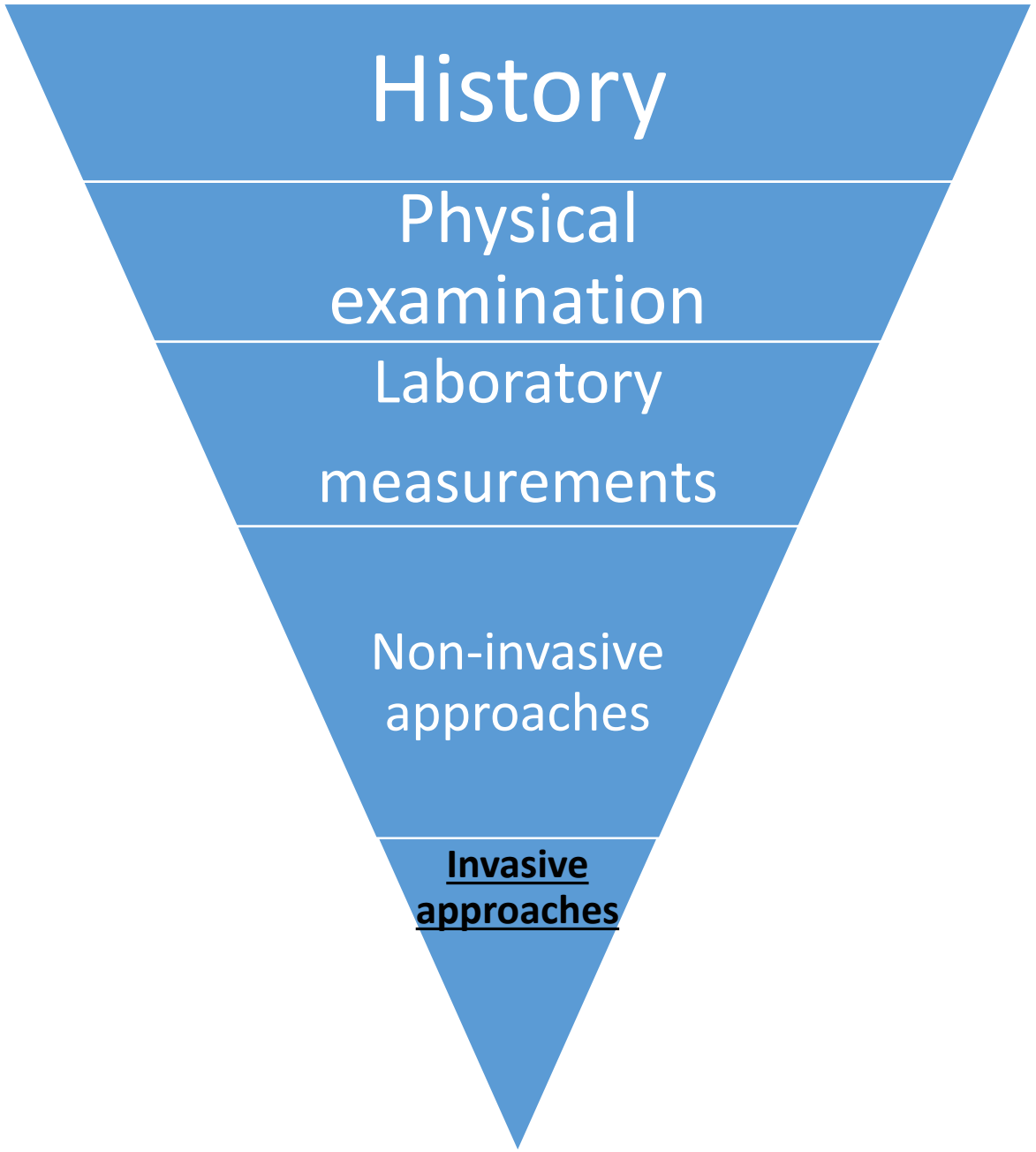
1. **General outlook – well, … , about to die.**
2. **Hydration, color, …**
3. **Vital signs – BP (standing), heart rate, Respiratory Rate, Temperature, Saturation (02)**
4. **Repeat now CT method Head,l Neck, Chest, Abdomen, …**



1. **Blood gases (pH, pC02, p02, ...)**
2. **Cardiospecific markers (troponines, BNP, …)**
3. **Blood count - differential**
4. **Inflammatory markers: Sed. Rate, C-reactive protein, procalcitonine, interleukin-6/10, …**
5. **Minerals (Na, K, Cl, Ca, P, Mg …)**
6. **Renal function – creatinine, urea, urine analysis …**
7. Status of coagulation INR/QUICK, aPTT, **D-Dimers**
8. Liver tests, bilirubin, amylases, (pre)albumin, …
9. **….**



1. **ECG**
2. **Monitoring of ECG, Blood pressure**
3. **X-ray – Chest**
4. **Ultrasound studies (echo in the case of heart, ultrasound of veins)**
5. **Computer tomography (CT) – pulmonary circulation, coronarography**
6. **Magnetic resonance (MR)**
7. **Functional tests– bicycle/treadmill ECG, tilt test, walking test, spirometry**
8. **SPIROMETRY …**



1. **Measurement of right heart pressures(CVP), intraarterial BP**
2. **Fibroscopy- gastroscopy…**
3. **Angiography**
4. **…**

CAUSES OF DYSPNEA ACCORDING TO LOCATION AND IMPORTANCE/URGENCY

	IMMINENT THREAT TO LIFE	LESS URGENT
Cardiac	Acute left/right heart failure/complications of AMI Decompensated hypertension - emergency Arrhytmia – VT, WPW, AVB Pericardial tamponade	Chronic left/right heart failure Equivalent of angina pectoris Pleural/pericardial effusion Stenosis of aortic valve, other valvular diseases Not sufficiently compensated hypertension
Pulmonary	Hemodynamicaly significant pulmonary embolism Tension pneumothorax Sever pneumonia .. ARDS	Hemodynamicaly non-significant pulmonary embolism Non-tension pneumothorax Pleuritis
Other	Mediastinitis (rupture of esofagus, …)	Anemia …

GENERAL THERAPEUTICAL APPROACHES:

- **Lifestyle measures**
- **Pharmacotherapy**
- **Instrumental/surgical therapy**

Older people - HISTORY:

Dyspnea:

- **Decreased mobility**
- **Completely different signs – confusion, adynamy, reverse of sleeping cycle/pattern, nycturia ?**
- **Heart failure with normal LV function**

MECHANICAL/INSTRUMENTAL TREATMENT:

ARTIFICIAL/MECHANICAL LUNG VENTILATION/PAP

OXYGENOTHERAPY

LVAD (HM II/III – left ventr. ass. device)

….

TRICKY QUESTIONS/SITUATIONS

- Cardiac x respiratory dyspnea
- Paroxysmal nocturnal dyspnea
- Cheyne Stokes respiration
- Kussmauls sign/respiration
- Holding breath for more than 20 s.

DYSPNEA: COMBINED ETIOLOGY + ANXIETY

- OBESITY
- SMOKING
- DIABETES
- HYPERTENSION

- HEART FAILURE
- COPD
- RENAL FAILURE
- PULMONARY EMBOLISM

SUMMARY:

- **DYSPNEA PRESENT – characterize (inspiratoryx exspiratory), how serious/debilitating:**
- **<u>Next question:</u>**

Provocing factors/alleviating factors – exercise, (emotional) stress/rest, exposure to allergens, infection, bleeding episodes …

- **<u>Next question:</u>**

Accompanying signs – chest/pleuritic pain, palpitation, wheezing, cough/hemoptysis, temperature, swollen leg, …

- **<u>Next question:</u>**

Previous diseases: IHD, hypertension, thromboembolic disease, valvular disease, … (history of pharmacotherapy) …

CASE REPORT- physical examination

- **Vital signs – BP, HR, RR, temperature, SaO2, *height, weight***
- **Head – anemia**
- **Neck – jugular veins**
- **Chest – pulmonary rales/cracles, wheezing, cardiac murmurs, gallop, …**
- **Abdomen – hepatosplenomegaly, ascites**
- **Lower extremities – edema**
- **Upper extremities – clubbing**

Tests: ECG, Chest X-rays, Echocardiography, …

Laboratory: natriuretic peptides, troponins, D-dimers, blood count, inflammatory markers, blood gases